

The Mining And Metallurgical Journal

VOL. XVIII. NO. 7

LOS ANGELES, CAL.

January 1, 1898,

SAN FRANCISCO, CAL.

Price 15 Cents

**The Gold & Silver Extraction Co.
OF AMERICA, LIMITED.**



TRADE MARK
CAPITAL,
\$500,000

The Original
Cyanide Process
Simple
Reliable
Economical
Gold Metal Colum-
bia Exposition
1893

Min Owners and others having Refractory
and Low Grade Gold and Silver Ores and Tail-
ings should have their material tested by
The MacArthur-Forrest Cyanide Process
Samples assayed and fully reported upon. Par-
ticulars upon application.

ADVISORY BOARD IN THE UNITED STATES
Geo. A. Anderson, General Manager;
Hugh Butler, Attorney; W. S. Ward;
J. Stanley Muir, Technical Manager.
CALIFORNIA AND NEVADA AGENT,
Bertram Hunt, 26 Sansome St., San Francisco

Office: McPhee Building, - Denver, Col.

Bullock's Diamond Prospecting Core Drills

These are the only Machines which will give absolutely accurate records of borings. Fifteen styles and sizes. Operated by hand, horse, steam, air or electricity.

Monarch Rock Drills

Any style of mounting. Simple, compact, economical. Operated by air or steam
Hoisting and Haulage Machinery to fill any requirements.

M. C. BULLOCK MFG. CO.,
1178 West Lake Street, CHICAGO, ILLINOIS

ADAMANTINE SHOES & DIES

AND
CHROME CAST STEEL
Cams, Tappets, Bosses, Roll
Shells and Crusher Plates.



These castings are extensively used in all the Mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to above conditions. When ordering send sketch with exact dimensions. Send for Illustrated Circular.

CHROME STEEL WORKS,

Kent Ave. & Keap St., BROOKLYN, N. Y. Stamp Cam

The Pelton Water Wheel

Affords the Most Economical and Reliable Power for Mining,
Electric and all other purposes.

7000 WHEELS NOW RUNNING

PELTON WATER WHEEL CO., 121 Main St., San Francisco, Cal.



BUYERS OF ALL CLASSES OF

BULLION, MATTE, ORE - MILL PRODUCTS, GOLD - SILVER BARS

Smelting Works { Leadville, Colorado.
El Paso, Texas.
Argentine, Kansas.

REFINERIES: ARGENTINE - KANSAS.

FOLLOWING CODES USED: At Argentine, Kansas.

A. B. C.
Morse & Nell's
and Bedford McNeill's.

Ore Purchasing Agencies

Spokane, Wash. Salt Lake, Utah.
Leadville, Colorado. Denver, Colorado.
El Paso, Texas. Argentine, Kansas.
Cripple Creek, Colorado.

THE EDWARD P. ALLIS COMPANY

MANUFACTURERS OF

Mining, Milling and Smelting Machinery

Crushers, Concentrators, Pumps, Compressors, Hoists, Boilers,
Reliance Crushing Rolls, Reynolds Corliss Engines, &c.

Send for Catalogue.

MILWAUKEE, WIS.

THE RUSSELL PROCESS

*The Improved Method of Lixiviation
for Free and Rebellious Silver and
Gold Ores and Tailings, Either Raw
or After Roasting. Send for New
Publications Just Issued : : :*

The Russell Process Co. - Park City, Utah.

THE ROESSLER & HASSLACHER Chemical Co.

100 William St., New York

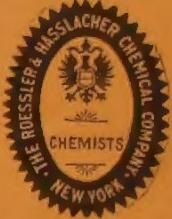
CYANIDE

Peroxide of Sodium

Hypoalumite of Soda

Chloride of Lime

Sulphide of Iron



Trade Mark

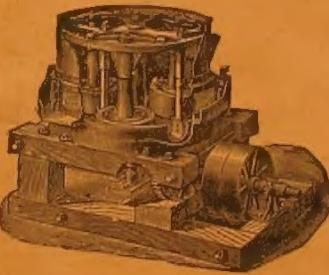
And Other Chemicals for Mining Purposes.

PARKE & LACY COMPANY

21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

LICENSEE FOR THE MANUFACTURE AND SALE OF

**The Huntington
Centrifugal Roller
Quartz Mill**



THE HUNTINGTON MILL is so well and favorably known among mining men throughout the world that any description of it would seem superfluous. They are in use in the United States, Canada, Mexico, Central and South America, Australia, China, Japan, and South Africa. In fact, wherever mines exist, and have given the best satisfaction of all quartz crushing mills.

The construction of this mill has lately been much improved and we claim it to be the CHEAPEST, MOST EFFICIENT, SIMPLEST, AND MOST DURABLE MILL UPON THE MARKET.

← CATALOGUE UPON APPLICATION →

Refractory Ores

Successfully treated by the
PORTER ELECTRICAL PROCESS

E. K. ALEXANDER,
Secretary

**The Porter Gold and Silver
Extraction Company**

No. 123-124 Henne Building,

LOS ANGELES, CAL.

Consolidated Kansas City Smelting & Refining Co.

BUYERS OF ALL CLASSES OF

BULLION, MATTE, ORE - MILL PRODUCTS, GOLD - SILVER BARS

Smelting Works { Leadville, Colorado.
El Paso, Texas.
Argentine, Kansas.

REFINERIES: ARGENTINE - KANSAS.

FOLLOWING CODES USED: At Argentine, Kansas.

A. B. C.
Morse & Nell's
and Bedford McNeill's.

Ore Purchasing Agencies

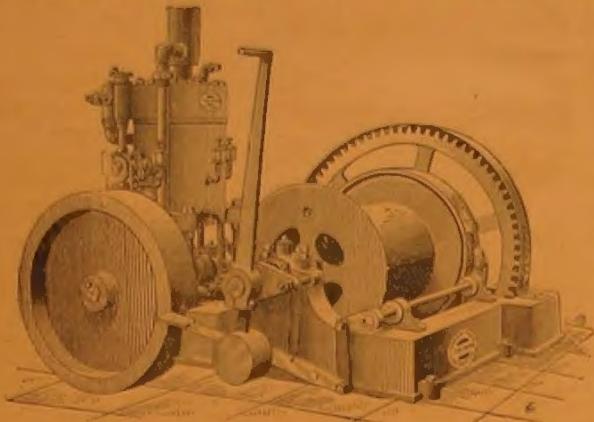
Spokane, Wash. Salt Lake, Utah.
Leadville, Colorado. Denver, Colorado.
El Paso, Texas. Argentine, Kansas.
Cripple Creek, Colorado.

W. O. ABBOTT, ASSAYER....

ASSAYING IN ALL ITS BRANCHES
CHEMICAL DETERMINATIONS ACCURATELY MADE

TOMBSTONE - - - ARIZONA

"Union" Hoist



Union Gas or Oil Engine and Hoist Combined, on strong, iron base.

No Fire No Steam No Boiler No Danger

TEN YEARS' EXPERIENCE. TWO THOUSAND ENGINES IN USE.

Started instantly. Compact, strong, simple, efficient, economical. Perfectly governed, so that oil is used only in proportion to the work done. No expense when idle.

Particularly Adapted to Mining in Localities Where
Fuel and Water are Expensive.

Built in the following sizes:—1 H.P., 4 H.P., 6 H.P., 8 H.P., 10 H.P., 15 H.P.,
20 H.P., 30 H.P., 40 H.P.

Send for Catalogue and state what H.P. required.

Union Gas Engine Co.,
301 Howard Street, San Francisco, Cal.

YUKON BOATS AND SLEDS

Stern Wheel Boats, 25 ft. to 200 ft. in length. Light draught.
Shipped—knocked down—and set up ready to run. Send for circulars and prices.

SAN FRANCISCO LAUNCH CO.: Cor. of North Point and Stockton Sts. San Francisco, Cal.

Pacific Coast and Mexican Agents

FOR

Kearny & Mattison's

Magnesia Sectional Steam Pipe and Boiler Covering

The only Covering that water
will not destroy. Indispensable
in covering pipes conducting
steam to pumps in mines.

ALL KINDS OF ASBESTOS GOODS

DE SOLLA DEUSSING COMPANY,

Send for Testimonials.

4 California Street, San Francisco, Cal.

EDWARD B. READ,
Engineers' Specialties, Cylinder and Machinery Oils, Cylinder Lubricators,

LORD'S BOILER COATING, Cyclone Steam Pipe Cleaner, Engine Compound
Electric Spiral Packing, Gasket Compound, Crank Pin Grease, Wire Rope
Grease, Gear Oil Grease, Belt Grease, Oil Skin Grease, Elevator
Grease, Crescent Flair Scraper, Oil Cup, Compound Cups, Dibble Lubricator,
Packing and engineers' supplies. CORUNDUM WHEELS.

No. 32 First Street,

San Francisco, Cal.

FRANCIS SMITH & CO.,

MANUFACTURERS OF

SHEET IRON & STEEL PIPE

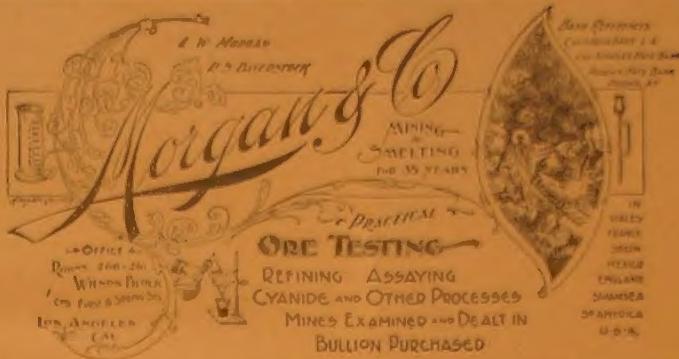
MINING PIPE ALL SIZES

Hydraulic, Irrigation and Power Plants. Well Pipe, Etc., all Sizes.

Iron cast, punched and formed, or making pipe on ground, where required. All kinds of Pools supplied for making Pipe. Estimates given when required. Are prepared for coating all sizes of Pipe with asphaltum.

130 Brannan Street

San Francisco, Cal.



THOMSON & BOYLE,



MANUFACTURERS OF
RIVETED STEEL

MINING PIPE,

MADE OF BEST SHEET STEEL.

Water Tanks, Oil Tanks, Steam Boilers, Ore Cars, Ore Buckets, Etc., Etc.

Correspondence Sought
312-316 Requena St., Los Angeles, Cal.

WILLIAM H. EMANUEL,

REPRESENTING

RAND DRILL COMPANY, Air Drills and Compressors
THE EDW P. ALLIS CO., General Mining, Milling and Smelting
TRENTON IRON CO., Machinery and Reynolds Corliss Engine
HENRY R. WORTHINGTON, Wire Rope and Bleichert Tramways
ROBIN'S BELT CONVEYOR

DENVER COLORADO

The Fifield Automatic Drilling

ATTACHMENT



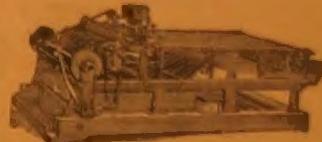
This tool is invaluable for mine repair shops, Millwrights, Machinists and for general construction work. Holes up to three quarter inch can be drilled by hand.

Packed in a box three inches square by eight inches long.

With 50 inch chain

\$5.00

WOODBURY CONCENTRATOR



No. 181 First St., San Francisco

McDearmon & Co.

Asbestos Boiler & Steam Pipe Coverings

Asbestos Cement for Boilers, drums, Heaters, &c. Etc. Special facilities for supplying the mining trade.

Pacific Coast Agent for H. W. John's Co's Asbestos
Boiler & Steam Pipe Coverings.

422 Sacramento Street, San Francisco, Cal.

MACHINERY

STAMP MILLS, Marine and Stationary ENGINES and BOILERS, New Mills and all kinds of new and second hand machinery.

Send for Catalogue
WASHINGTON MACHINERY DEPOT
PAIGE, WASHINGTON

KLONDIKE

WANTED—Men and Women to
work at the Klondike, Alaska and
Bucknerfield in KLONDIKE. We
pay all and make expenses on
the way. Come up from the coast
as soon as possible. Address
G. W. MACOY,
1011 Clay St., Portland, Ore.

For Further Information address
Rix Compressed Air Machinery Company

11 and 13 FIRST ST., San Francisco, Cal.

W. N. JEEU.

Assay Office & Chemical Laboratory

Rooms 46 and 47 Montgomery Bld.

62 Montgomery St., SAN FRANCISCO, CAL.

Or any analysis of minerals, metals
and their alloys, etc. Lessons given in assaying

ADVERTISE

— IN —
... THE JOURNAL

CHAS. C. MOORE & CO.

ENGINEERS AND DEALERS IN

BABCOCK & WILCOX BOILERS.

McINTOSH & SEYMORE ENGINES,

HAMILTON CORLISS ENGINES,

N. Y. SAFETY AUTOMATIC ENGINES,

GOUBERT FEED WATER HEATERS,

STRATTON STEAM SEPARATORS,

SNOW STEAM PUMPS,

QUIMBY SCREW PUMPS,

GREEN'S ECONOMIZERS,

WHEELER CONDENSERS,

BARNARD-WHEELER COOLING TOWERS,

HOPPES LIVE STEAM PURIFIERS

EDMISTON FEED WATER FILTERS,

BUNDY STEAM TRAPS,

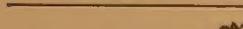
SPENCER DAMPER REGULATORS,

HYATT ROLLER BEARINGS.

Watch this Space for description of the above Machinery.

Send for Catalogue and Full Information.

19 First Street, San Francisco, Cal.



Miners and Mining

GATHERING RUBBER Crack Proof Boots, White Rubber Coats, Oil Clothing

BELTING, PACKING AND HOSE

573, 575, 579 Market Street,
SAN FRANCISCO, CAL.

GOODYEAR'S

RUBBER GOODS

— FOR —

THEODOR LEXOW

105 Broadway New York

Importers of

CARBONS

— FOR —

DIAMOND DRILLS and all Mechanical
Purposes

Henry Demmert

J. HOWARD WILSON

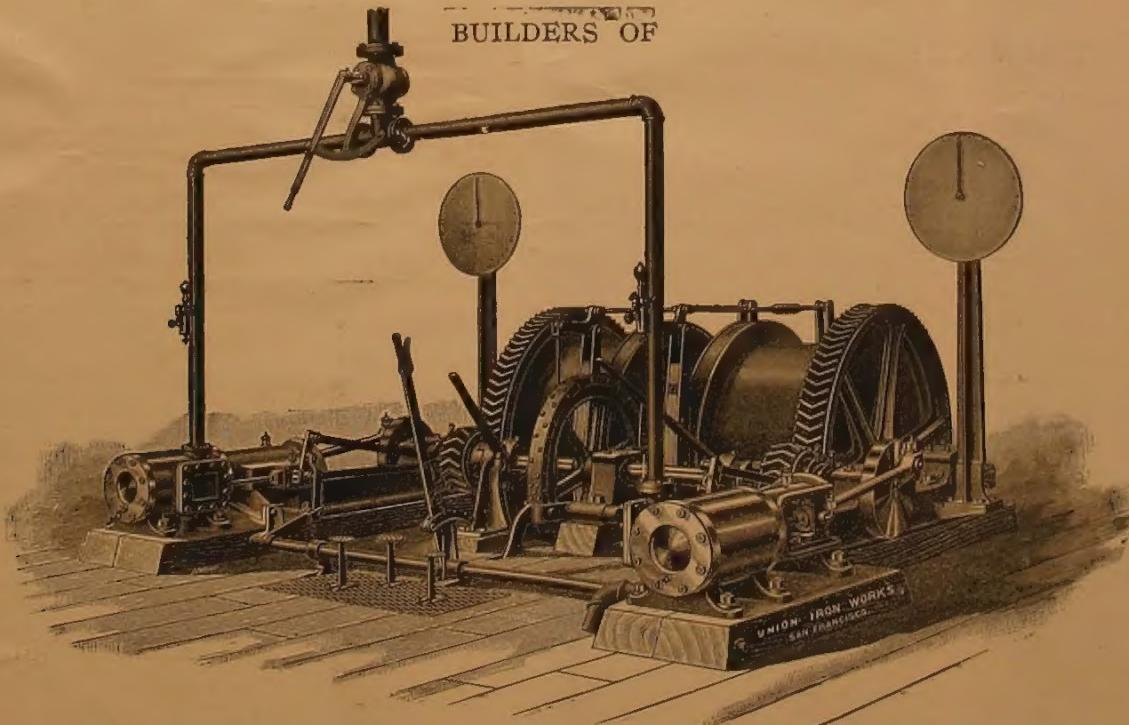
Assayer and Chemist

A Specialty Made of Umpire Work.

306 Santa Fe Ave., Pueblo, Colo.

UNION IRON WORKS

BUILDERS OF



Mining, Milling, Concentrating and Smelting Machinery

222 MARKET STREET, SAN FRANCISCO, CAL.

SEND FOR NEW CATALOGUE

PETER HEER,
252-254 E. Washington St., - CHICAGO
Manufacturers of Highest Class
Engineering and Mining Instruments,
T-Squares, Triangles, Scales, Etc. Repairs carefully and promptly executed. Drafting Supplies of all kinds. Catalogue on application.

SCHOOL OF
Practical Mining, Civil, Mechanical,
Electrical Engineering, Metallurgy,
Cyanide Process, &c.
Surveying, Architecture, Drawing and Assaying
633 MARKET ST., SAN FRANCISCO, CAL.

A. VAN DER NAILLEN, President.
Assays of Ores, Bag; Rollers and Chlorination
Assay Set; Brownope Assay Sto. Full Course
of Assaying, Etc. Established 1884.
Send for Circular.

JOHN T. REED

Assayer and Analytical Chemist

Assays made for all valuable metals. Analyses made of all valuable minerals. Special attention given to the sampling of mines. Estimating the value of and testing the nature of their ores. 100 pound lots of ore assayed, and working tests made by Cyanide, Amalgamation and Chlorination Processes.

OFFICE 522 COURT STREET,
San Bernardino, - - California



KLONDIKE MACHINE.

If you are going to the Klondike or any other country in placer mining you cannot afford to be without one of our placer machines. It will work any class of placer ground, river or sea sand, it will make a clean saving of the fine float gold as well as the coarse. The material is separated into four different grades in passing through this machine, a coarse screen is arranged over the hopper to cut out the rocks and gravel; it is fed regularly on to the screen below; a series of riffles are arranged at the end of this screen to catch any coarse gold that will not pass through the screen, the material then passes over the riffle table (steel having thin tines) to the cylinder, which has a coarse gauge and Cylinder; this fine screen cuts out all the coarse gauge, allowing nothing but the water and fine material to pass through the Amalgamator, this avoids any scouring whatever. The screen over the Cylinder has a side shake; the riffle table and hopper has an end shake moving both together, can be set at any pitch, each separately, can be run fast or slow to suit the work being done, this machine is just the machine for dry countries, as it requires very little water. By attaching one of our pumps the water can be used over and a large amount of work can be done with a small amount of water, the pump will lift water 20 feet from a stream or well. As a gold saver this machine has no equal, it is light, simple, and durable, can be packed, the heaviest piece weighing 50 pounds, built almost entirely of metal, three sizes, price \$100, \$200, \$400, capacity 10, 25 and 40 tons; weight, 175, 400, and 500 pounds. PACIFIC MINING MACHINERY CO.

129 First St., San Francisco, Cal.

The Kootenai Gold Mining District

of British Columbia, which of late has been attracting considerable attention, is best reached by the Oregon Railroad and Navigation Co. The fact has recently been brought out that the Kootenai district contains within its borders more High Grade Silver and Lead Mines than any other part of the world. The recent discoveries of Rich Gold Lodes makes it the most attractive country for the Capitalist Miner and Prospector to visit in search of mines.

The Oregon Railroad and Navigation Co.
Dispatch Fast Steamers every Five Days

from San Francisco connecting at Portland, Oregon with their rail line for all points in this famous district. For full particulars address,

F. F. CONNOR, GENERAL AGENT.
630 Market Street, SAN FRANCISCO, CAL.

THE NATIONAL IRON WORKS

IRON & STEEL WATER PIPE & WELL CASING

Riveted Boilers, Tanks, and Sheet Steel or Iron Work of every description.

MANUFACTURERS OF THE

Repairing of All kinds Promptly Attended to.
PORTLAND, OREGON

**Assayers AND
Chemists
SUPPLIES**

MANUFACTURERS OF

Crucibles,
Scorifiers,
Muffles,
— AND —
• FIRE BRICK •
— AGENTS FOR —
Baker & Adamson's Celebrated
Acids and Chemicals
— DEALERS IN —

Glassware,
Porcelaine Goods, Etc.

— THE —
Standard Fire Brick Company,
Pueblo, Denver, Colo.

THE GOLDEN GATE
Gas or Gasoline Engine
Mining Hoists A Specialty

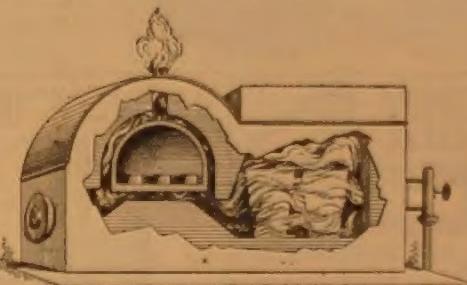
MADE BY
ADAM SCHILLING & SONS
211-213 Main St., San Francisco,
Send for Circulars and state Horse Power
Required.



THE CHEAPEST IS NOT ALWAYS THE BEST!

POSITIVE STEADY MOTION

LONERGAN & CALKINS' Combined Melting and Muffle Furnace,



Both furnaces always hot and ready for use. One burner suffices. A saving of one-half in fuel used. Compact and convenient to transport to and from mines and on prospecting trips. Furnace revolves on a pivot. After making one melt with burner inserted in melting end reverse furnace. Insert burner in muffle end and you are prepared to continually melt and erupt without further disturbing furnace. A special feature of this is the oxidizing bonnet (not shown in illustration) by which a continuous flow of fresh air, controlled by a damper, is passed through the muffle.

LONERGAN & CALKINS, Gold and Silver Refiners,
Assayers and Bullion Buyers.
127 West First Street, LOS ANGELES, CAL.

THE TRUAX PATENT IMPROVED

AUTOMATIC ORE CARS

Manufactured by
CHAS. B. BOOTH & CO.



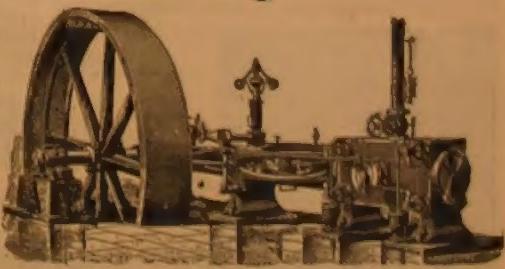
125-126
SOUTH LOS ANGELES ST.
LOS ANGELES, CAL.

Bend for our Catalogue and Prices

The Bates Corliss Engine

SIMPLE AND COMPOUND

It embraces in its construction all that is Superior in the original Corliss type, together with many new and important features which give increased efficiency with lesser degrees of complication.



Caldwell Bros., Agts. Tacoma & Seattle, Washington

Mexican, American and Foreign Patents,
TRADEMARKS, ETC.

Reports on Mining and Other Properties.
Proprietors of Weekly Anglo-American, a first-class Advertising Medium.
Established 8 Years.

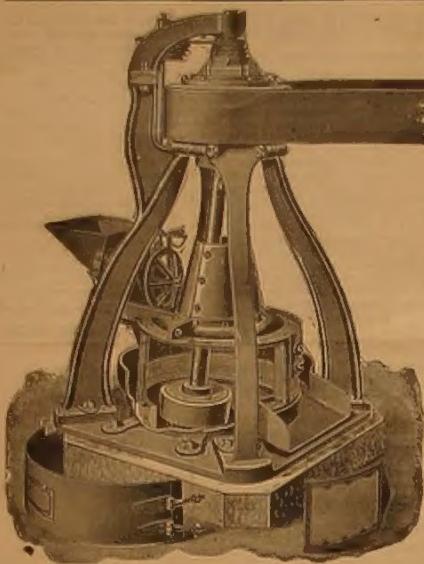
C. H. M. & Agramonte,
P. O. Box 388. Cable Address, "Agra"
CITY OF MEXICO, MEXICO

THE S. S. MACHINERY CO.

Buy, Sell and Trade in All Kinds of SECOND-HAND
Mining and Wood Working Machinery.

CORRESPONDENCE SOLICITED.
OFFICE: 1280 Lawrence
WORKS: Sixth and Market

DENVER, COLORADO
TELEPHONE Office, 120
Works, 1284



THE GRIFFIN MILL

The only Perfect Pulverizer Working both
Wet or Dry
Process

NO JOURNALS IN PULVERIZING CHAMBER.

Delivers a finished product. Will
pulverize 1 to 2 tons per hour on Port-
land Cement, Quartz or ores depend-
ing on hardness of material and firm-
ness of product.

Manufactured and Sold by —

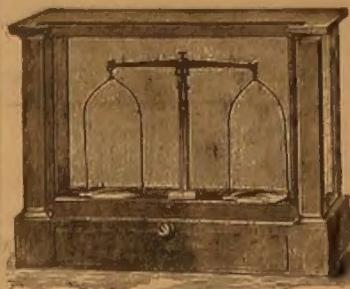
Bradley Pulverizer Co.,

93 STATE STREET,
Boston, Mass.

Assayers' Materials.

Miners' and Chemists' Supplies

OF EVERY DESCRIPTION



C. P. Cyanide Potash, (98-99 per cent)
Borax Glass, Dioxide Sodium

Fine Balances,
Crucibles, Muffles, Furnaces

Chemicals

Send for Illustrated Catalogue

F. W. BRAUN & CO.,

Wholesale Druggists,

Los Angeles, Cal.

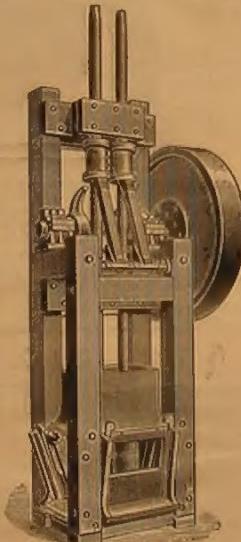
JEFFREY

Roller, Steel and Special Chains
FOR
ELEVATING
AND CONVEYING
MACHINERY.
FOR HANDLING MATERIAL OF ALL KINDS.
POWER TRANSMISSION
MACHINERY.
COAL MINING MACHINERY.
Wire Cable
Conveyors.
For long and
short distances
conveying.

THE JEFFREY MFG. CO.
Columbus, Ohio.

314 Equitable Bldg.
DENVER, COLO.
Send for Catalogue.

"HENDY" IMPROVED

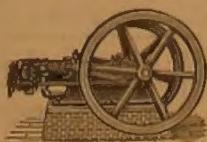


Triple Discharge Two-Stamp
MILL
Capacity six to ten tons per day
PRICE, \$450.00

JOSHUA HENDY MACHINE WORKS
38 to 44 Fremont St., San Francisco, Cal.

LAMBERT
Gas, Gasoline and
Distillate Engines

TANKS, PIPE
and
WATER
SUPPLY
GOODS



Call on or Address,

S. J. SMITH,

230 East Fourth Street, LOS ANGELES, CAL.

J. H. MASTERS,
Manufacturer of and Dealer in
Ore Sacks, Tents, Camp
Furnishings
217 Commercial St.,
LOS ANGELES, CAL.

Mines Examined

Processes Tested

HORACE F. BROWN, M. E.

PATENTEE OF

BROWN'S System of MECHANICAL ROASTING
FURNACES, Complete Automatic Milling
Processes, Etc.

1006-7 MANHATTAN BLD., CHICAGO

E. C. WOODWARD,
Assayer and Chemist

Telephone 315

24 E. Kiowa St., Colo. Springs, Colo.

SCREENS
OF ALL KINDS

Perforated Metals
of every description

THE HARRINGTON & KING PERFORATING CO.

(CHICAGO)
ILL.U.S.A.

The Harrington & King Perforating Co.,

117 N. UNION ST., CHICAGO ILL., U. S. A.

EASTERN OFFICE 284 PEARL ST. NEW YORK

The Mining And Metallurgical Journal

REGISTERED AT THE POST OFFICE AT LOS ANGELES, CALIFORNIA,
AS SECOND CLASS MAIL MATTER.

VOL. XVIII. JANUARY 1 NO. 7

F. W. EDELSTEN, Editor.

JOHN STEWART,
Special Contributor.

ULRICH KNOCH, Publisher

OFFICES | Stimson Block, Los Angeles, Cal.
64-65 Merchants Exchange, San Francisco, Cal.

SUBSCRIPTION PRICE:

For United States, Mexico and Canada.....	\$2.50 per annum
" " "	1.25 six months
All other countries in the postal union.....	3.50 per annum
" " "	1.75 six months

ISSUED SEMI-MONTHLY

SPECIAL REPRESENTATIVES:

The Journal is kept on file at the following places where contracts for advertising can be made:
 Denver, Colorado—Ed. P. Eppich & Co., 29 Bank Building.
 Salt Lake City, Utah—Lester Wallach Adv. Agency, 15 W. and South Street.
 Vancouver, B. C.—E. E. Galloway, Arcade.
 Chicago, Ill.—E. Sprague, 30 Dearborn Street.
 City of Mexico, Mexico—O. H. M. Agramonte, 17 Cinco de Mayo.

ADVERTISING RATES FURNISHED ON APPLICATION.

THE PROSPECT STAGE OF MINING.

In the western United States the new discovery or claim on which a mineral find of economic value has been made is generally termed a prospect. Such a claim is an embryo mine in the as yet speculative stage of its career. In rare instances however, claims have been found which show a sufficiently large surface exposure or outcrop of workable quality and quantity on the surface, without much work on the deposit of ore being done to give it the value, which the aid of natural favorable local conditions only have given it a commercial standing. In the very large majority of cases however, mining work to a greater or less extent has to be done, to demonstrate value and locate the pay shoots of ore on the vein or deposit. The expenditure of capital in this work constitutes the speculative stage of mining, both in a lineal direction along the strike and across the width of the vein, and also by sinking on it in depth, or by tunneling into a hill to cut it in depth. In these operations, in these operations, the industrious prospector who understands his business, and can grasp the geological conditions and environment of the claim, can save much labor, time, and capital in arriving at the true value of his discovery.

The ability to discover minerals of value is the first requirement of the prospector; but the knowledge and experience to develop them, with the least amount of trouble and expense, is his second and most important qualification, and one which is gained only after years of experience in such work, hence it is that the old miner makes the best prospector.

The recent revival of the mining industry, coming at a time when other lines of trade were suffering from depression and dull times,

has had the effect of attracting many who were not miners to the work of prospecting for gold mines, hence the necessity of these remarks for the benefit of those who do not realize the difference between a mine and a prospect. It is during the prospect stage of mining that the speculative element of the business is now almost confined.

The prospector having located the pay streak along his ledge on the surface, and tested his extent of ore in depth, by sinking shafts, cross cutting, and driving levels, is generally by the aid of such work in the position to know what he has got, and to calculate value and take out ore. When conditions have arrived at that point, the speculative prospect has passed into the condition of a mine, and by keeping the development work in advance of the business of extracting pay ore, the risk and speculation ceases, and the enterprise is a commercial undertaking.

The desire of capital to purchase only claims showing ore in sight, with shafts and levels opened, and the large increase in recent years of the mining industry in all countries, have tended to bring about this condition, so that risk and speculation in mining is now largely confined to the prospecting for minerals.

PROSPECTS AND MINES.

The evolution of a prospect into the condition of a producing mine is generally a slow operation, requiring much preliminary testing of ore and work to ascertain value, and open the deposit to show extent of ore in sight, and to admit of the employment of a force of miners in stoping or extracting the pay ore.

The best rule which can be laid down to determine when a prospect has changed into the condition of a mine, is its ability to produce ore in paying quantity, and have sufficient work done, or ahead of the stoping ground, so that each class of miners are not in the way or retarding the work of the others not similarly engaged. The first fifty feet, or even one hundred feet in some cases, of the surface of the vein or deposit, ought to be left untouched, to support the surface and keep out water, and is always ore available, if the mine should become exhausted. The hand to mouth system of working a mine, when there is no ore blocked out ready for stoping, keeps that mine in the prospect and consequently speculative stage of development. Ore reserves in the stopes of a mine are the stock in trade of the thrifty miner. The necessity for development work to be carried on, by sinking shafts and driving levels to locate new ore bodies or pay shoots, before the ore at present being worked becomes exhausted, keeps the mine out of the speculative and uncertain condition, and reduces mining to a commercial enterprise of extracting the raw material and placing it on the market. Even in the case of large surface exposures of ores such as iron, copper, and large low grade gold ore deposits, the prospect stage often requires a large amount of work to be done to ascertain quality and value, and to prepare for the active operations of mining on a large scale. The future value and extent of a vein or deposit are unknown quantities, and it is the first duty of the manager and owners to ascertain these all-important facts as far in advance as means on hand will permit, even if it is at the sacrifice of a delay in declaring a dividend. The development of new stopes of ore is the best

bank into which a mine owner can put his capital, and the neglect of it has brought ruin to many a mining enterprise. An unlimited supply of ore beyond present needs makes mining a sure and safe investment.

THE SQUARE MINING LOCATION.

At this time when there is agitation by a few parties only, at mining association meetings throughout the different States for amendments to our present mining law, the chief outcry is against the most just provision of our present apex law which allows the miner to follow the dip of his vein or deposit by continuous work underground on the same vein or deposit to an indefinite depth towards the center of the earth. By these theoretical miners and would-be Doctors of Law, the contention is advanced that the cure-all exists in substituting a square location of large area with vertical side boundaries as is practiced in the Eastern States, in place of the present parallelogram of 600x1500 feet with the right to follow the dip. Under both forms of patenting mining claims the error arises in our government ceasing to control the mining industry for the benefit of future and adjoining owners, and in the interests of capital invested in deep mining operations.

Dr. A. M. Raymond says on this subject when reviewing: "The Ontario Mining Act, as framed in 1892, seems to me to embody a very judicious attempt to continue the encouragement of exploration and mining with the retention of sovereign control and supervision. It * * * grants and regulates the rights and privileges of mining." But he ought to have added that it is only a half measure of justice to the miner, as half the minerals of that country have passed into private control prior to the passing of the act. In early times in the Province of Ontario the minerals were reserved (the same as in early times in the United States) in patenting land, but a Conservative government who conserve nothing except to themselves, departed from the just provision for aid to the miner, and subsequent administrations have done the same, hence the above remark.

Under our present system in the western states when dispute arises, recourse is had to courts of law in place of being settled by arbitration by mining men couversant with the conditions and justice of the case, hence the evil of our present system. This evil does not exist in the form of our mining claims, or in prosecuting deep mining by following the dip by continuous work, but wholly in our wrong manner of administering justice in mining disputes, and in having recourse to courts of law and lawyers to settle them, whose business it is to carry the case along for all there is in it. On this subject see our issue of 15th November last on "Mining Disputes in Law Courts."

The chief objection to the square location of large area is that it covers and monopolizes more veins or deposits than the ore body for which it is granted. This condition is due to the parallel mode of occurrence of mineral veins and deposits, both of the same mineral for which the claim is granted, and of different ores of other minerals which lie parallel to it, in nearly all mining districts. For that reason it is not as just a law as our United States western mining claim location on Federal lands. The vertical side line boundaries of the square location in countries where roads and concession lines run, cause a change of ownership to the minerals which capital

has developed, and are a preventive to deep mining when the deposit dips, and a condition which is not in the interests of capital invested in mines. The square form of survey is a good surface boundary for land areas, but not a good mining claim condition, and to adopt it in the western states would be a step against the best interests of the mining industry in almost all sections except for minerals such as coal areas, where the mineral is found in the float or horizontal position. The abandoned mines of the eastern states where the deposit dipped into an adjoining property, are lasting monuments of the injustice done to capital invested in eastern mines under the square location. They show the necessity of the contention that mineral ownership is, or ought to be, separate and apart from surface conditions and laws, and that the mining industry in all states of the Union requires government inspection and careful supervision to attain the best results in the interests of labor and capital invested in mines.

THE ORES OF ALUMINUM.

In a recent issue the *Canadian Mining Review*, which is the leading mining paper in Canada, prints the following remarks *en passant*. It is, however, worthy of more than a passing glance, as the mistake of supposing that any mineral rich in aluminum is a suitable ore of aluminum is a common error.

"A remarkable bed of pure white clay has been discovered some twenty miles north of Christina lake, on McCrae creek in British Columbia. The deposit is quite extensive, running for 1,300 feet on the surface, and it is known to have a depth of over twelve feet. Assays made by the Pratt-Fairfawcet Co. of Northport, and E. B. Van Osdel of Spokane, Wash., show it to be extraordinarily rich alumina, running from 31.2 to 43 per cent, which would be equivalent to \$165 to \$185 per ton of pure aluminum. The locators, Messrs. Latta, Teale and others, are now in communication with some of the aluminum works in the east to have its commercial value fully determined."

From the description given and the analyses quoted the material apparently is a high grade pottery clay worth say \$5 a ton, if within reach of transportation facilities and when landed at a commercial point such as Vancouver. As an aluminum ore it is valueless, as silicates of alumina are not at present available as a source of aluminum by the ordinary electric process. The reason of this is that the silica as well as the alumina is reduced in the electric furnace, and consequently only substances free from silica and holding a workable percentage of aluminum are admissible under present conditions of the electro-metallurgy of aluminum. The only mineral used at present for this purpose is the Greenland spar or cryolite of the composition $3 \text{NaF} - \text{AlF}_3$ — aluminum 13.0, sodium 32.8, fluorine 54.2 — 100.0. It is found in a bay in Arksut fiord, in West Greenland at Enigtoq about twelve miles from the Danish settlement of Arksut, where it constitutes a large bed or vein in gneiss, and contains galena, sphalerite, siderite, pyrite, arsenopyrite, fluorite, columbite, cassiterite all often in fine crystals. Its colors are snow-white sometimes reddish or brownish to brick-red and even black. Sub-transparent-translucent and brittle, more transparent when wet. It is shipped to Europe and to Pennsylvania and used as a source of sodium and aluminum in the manufacture of salts of these metals

and of recent years as an ore for obtaining metallic aluminum by the electric process. The value of this interesting mineral and the difficulty and expense of obtaining it from Greenland ought to stimulate prospectors operating in the Archaean or Laurentian rocks of the United States and Canada in the search for it. As it will melt in the flame of a candle it is easily distinguished from other minerals.

At the Metcalf gold mine in San Bernardino county, Cal., a natural alum is found associated with quartz and iron pyrites and being soluble in water it might be recrystallized and used as a source of alum or of metallic aluminum. The occurrence is interesting to mineralogists as a vein matter associated with gold ore apart from any commercial value it may represent.

THE WORLD'S GREAT BANKS.

Nearly every European nation has a bank which is not exactly a part of the government but an adjunct or aid. The bank manages the nation's finances but is nevertheless under control of the legislative and administrative branches of the government. Of course the functions of the bank are prescribed by law, and it receives direction from the fiscal office of the state from time to time.

There are four great banks, the state Bank of Russia, which has on the average a gold reserve of \$480,000,000; the Bank of France, with a gold reserve of \$330,000,000; the Bank of Germany, whose gold reserve is \$185,000,000, and the Bank of England, with a gold reserve of \$135,000,000. The reserves necessarily fluctuate to some extent, but the managers check withdrawals by raising the rates of interest and exchange, whenever the reserves are in danger of running below what is desirable.

The Bank of France also has a reserve in silver to the amount of \$225,000,000, and it divides withdrawals between the two classes so as to preserve a substantial equilibrium. The metal money of France is \$800,000,000 gold and \$700,000,000 silver. The Bank of Germany also holds a silver reserve of \$100,000,000, and resorts to practices similar to those of the Bank of France to preserve a certain quantitative relation between the two classes of reserves.

The gold reserves of these four great banks comprise about one-third of all the gold of the world devoted to monetary uses. They supply their respective countries with all paper circulation, and are required to redeem it with metal money. They are the great factors in European financial affairs. However, in many respects the Bank of England is less potential than the great banking house of the Rothschilds. In emergencies the state banks support their respective governments with all their resources.

THE MONETARY PROGRAM OF SECRETARY GAGE.

The JOURNAL is not a party paper, but it is deemed proper to convey information that directly affects the mining industry and the business of the country. Every financial measure has its influence upon both. On this subject there are radically different theories, and the bill which Secretary Gage has caused to be placed before the Committee on Banking and Currency of the House of Representatives reflects the views of one extreme.

Mr. Gage is frank in stating that the object of his bill is to commit the government more thoroughly to the gold standard, and we perceive it will have that effect if enacted and faithfully executed. It authorizes the Secretary of the Treasury to issue a new series of bonds bearing $2\frac{1}{2}$ per cent interest, and payable, principal and interest, in gold coin, to take up the series of bonds falling due in 1904 and 1907, which bear interest at 5 and 3 per cent respectively, payable in coin. The laws which authorized the issue of these two series do not confer the power on the Secretary of the Treasury to stipulate otherwise than to pay in coin, though the practice has been invariable to pay in gold coin. If the bill becomes a law the government will be explicitly committed to the issue of bonds only which are payable in gold coin.

The other feature of the bill relates to dealing with the question of currency. It provides somewhat elaborately for the ultimate retirement of the United States notes, treasury notes issued under the act of 1890, and the silver certificates. The gold certificates are left untouched. The scheme is to deprive the government of the power to issue paper circulation, and to confer it exclusively upon the National banks. The banks are allowed to deposit bonds, as they now are, with the treasury as security to the government for guaranteeing their notes, and on which they can receive circulation to the full face of their deposited bonds. Another provision allows them to deposit United States notes, treasury notes and silver certificates and receive circulation from the Controller of the Currency to the extent of the face value of such deposits. In addition they may issue notes in excess of their deposited securities, bonds and others, when such securities equal fifty per cent of their capital, and for guaranteeing such excess the government is to be protected by being made a creditor with first privilege on the assets of the bank.

The aggregate of the circulation issued to the banks, except upon that issued on deposited bonds, is limited to \$200,000,000. United States notes, treasury notes and silver certificates aggregate about \$600,000,000, and deducting the \$200,000,000 leaves \$400,000,000 to be retired in some other way, which is not provided for in the bill. The presumption is that they are to be retired by the issue of gold bonds or by cancellation when taken in as rapidly as the excess of revenue over expenditure will permit. Under the Dingley law there has thus far been a deficit, and no one confidently predicts a surplus in the future, hence it is possible that retirement by bond issues is in contemplation. Mr. Gage states the present bill is to be supplemented by another, the precise character of which has not been indicated.

The bill, so far as it goes, does commit the government to the gold standard, and if enacted there will be no legal tender money except gold, though until existing laws are repealed silver dollars will retain that quality. It will be observed that the bill makes no provision for enlargement of the money volume to supply the exigencies of increasing population, production and commerce, except through gold coinage and of subsidiary silver coin, and the will and pleasure of the banks, to which is confided sole power to control and regulate the volume of paper money. The bill is likely to be stubbornly resisted by the friends of silver and those who fear danger from conferring a power so great and exclusive upon the banks.

Self Tightening Cam.

We are pleased to call the attention of the mining public to the latest and certainly a very meritorious improvement in the construction of stamp mills, which Messrs. Fraser & Chalmers, of Chicago, Ill., have just placed upon the market.

The "new" Blanton Cam needs only to be understood to be appreciated. The practical mill manager is astonished at its simplicity and pleased with the results. A cam held securely to the cam shaft without keys or loose parts of any kind is certainly a novelty. The cam and the shaft are the only parts

It will be observed that this tightening takes place over the entire circumference of the shaft, thus equalizing the stress in the hub of the cam. At the same time there cannot be more stress than is absolutely necessary to do the work, thus avoiding all undue strains incident to driving keys, etc.

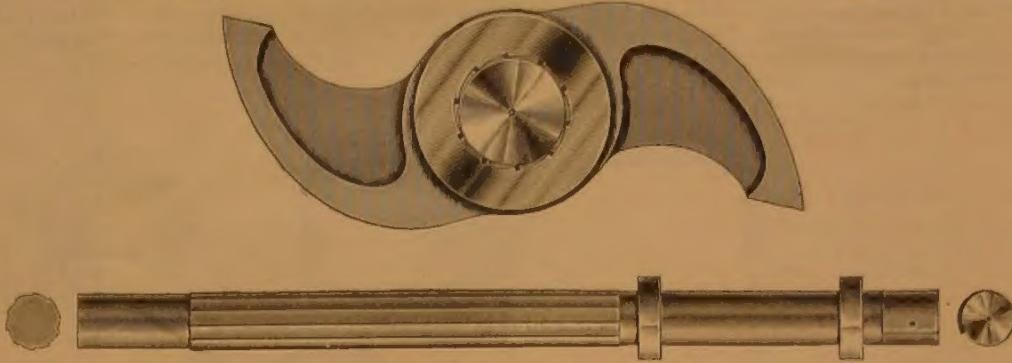
When necessary to take off a cam, a slight blow on the back edge with a hammer loosens it instantly.

The cams are duplicates and interchangeable, so that they may as before explained be used in any position.

NOTE.—The Blanton fastening can be used for line shafting and many other purposes.

Among the large belts recently manufactured by Mr. Degen is one 40 inches wide and 80 feet long for the Buckeye Mills of Marysville, Cal.; one 30 inches wide and 130 feet long for the Crown Mills of Stockton; one 24 inches wide and 100 feet long for Hobbs, Wall & Co's new box factory, besides all the smaller belts.

The Horse Shoe Brand Lace supplied by Mr. Degen is pure fulled rawhide made from the best slaughter hides and by the latest and most improved methods. It is unexcelled for evenness, softness, strength and finish. It is free from cuts, brands and grubs, will remain soft and pliable in all climates, and age does



NEW IMPROVED BLANTON CAM AND SHAFT

used in this peculiar fastening, which is explained by reference to the accompanying cuts.

The fastening in this case has ten taper faces, equally divided so as to distribute the cams properly to make five or ten drops of the stamps as the case may be. The section of cam shaft where cam is secured is the same, whether for five or ten stamps. The ten taper faces on the shafts, and the corresponding faces in the bore of the cams, are made with mathematical precision by machinery specially designed for the purpose, thus insuring the proper fit and division of the cams on the shaft.

A Leather Belting Factory.

One of the most attractive displays at the Mechanics' Fair held in San Francisco was that of L. P. Degen, manufacturer of leather belting, whose factory is located at 105-107 Mission street, San Francisco.

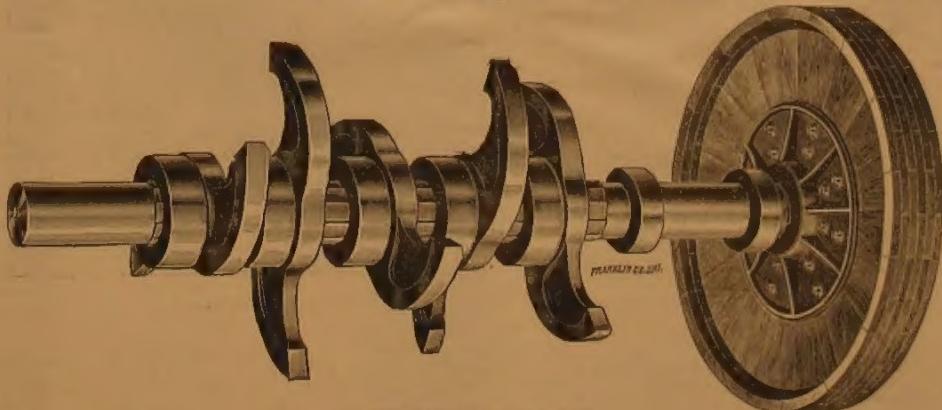
This factory was established twenty-one years ago, and is the leading belting factory on this coast, having had an uninterrupted career of prosperity from the beginning.

The more modern machinery, with the very latest improvements, is used in the manufacture of the leather belting, the best grade of

not affect it. It costs no more than ordinary lace and is superior to all others.

At the State Fair, held in Sacramento in 1890, the belting made at this factory was awarded a silver medal; in 1891 the Star Brand Belting was awarded a silver medal and the Rawhide Lace Leather a diploma; in 1893 the highest reward was given by the Midwinter Fair, while at the last Mechanics' Fair the exhibit was awarded a diploma for the best oak tanned leather belting.

The exhibit this year was devoted to the display of the many lines of leather goods that are manufactured. Forming at attract-



CAMAS ASSEMBLED ON SHAFT

Although the cams will be located and marked to correspond with our standard drop, the mill superintendent can arrange the cams for any drop he may prefer, without the slightest alteration, either of cams or shaft.

The great advantage of this fastening is in the convenience which it obtains in erection and operation of the cams. It is only necessary to place them on the shaft at their respective positions, and tighten on the taper faces to hold them in position until put into operation, when they will tighten themselves further on the shaft in proportion to the amount of work they have to do.

which is known as the Star Brand, being made from carefully selected steer hides, thoroughly stretched, well cemented and riveted, coated with waterproof dressing and guaranteed to run perfectly true.

Dynamo belting receives special attention. All of this is made entirely from the centers or solid parts of the leather, and treated with a composition which fills the pores completely and adds very much to the strength, making it more pliable, and at the same time leaving it firm and less liable to stretch. This is of vital importance to swift and steady running machinery, especially dynamos.

ive background to the booth is an immense hide which was the largest in California, while in the foreground were seen oak tanned and round leather belting, rawhide rope and various kinds of belt fasteners. With the main display were some of the attachments used in placing a belt in running order. Wire lacings, electric belt dressing, round belt couplings and fulled rawhide lacing of this character and made an attractive addition. The display in general did justice to the artistic arrangement made under Mr. Degen's supervision, and added luster to the already excellent reputation of that house.

The Oneida Hoist.

We publish herewith an illustration of the direct-acting steam hoist, erected upon the Oneida mine, near Jackson, Amador county, California, by the Union Iron Works of San Francisco, whose works have been established on the Pacific Coast since the year 1849. Their progress and prosperity may be noted by the steady growth from a small shop until today it is the largest and best equipped plant of its kind in the United States.

As their manufacture of mining and metallurgical machinery dates back to the earliest mining in California, their experience, as a natural result, has been extensive; but it is not limited to the state of California alone, for their mining and milling machinery can be found in all the mining camps and districts

One of our readers, Mr. J. Q. McKinney of Garlock, Kern county, Calif., submits the following question:

"Will you please inform me about the location law containing the following proposition: 'A.' locates a claim in 1895, fails to do the work in 1896. 'B.' locates the same property Dec. 1896, and does the annual assessment work. 'C.' locates the property in January, 1897, and does the assessment work. All locations were duly recorded. 'To whom does the claim belong?'"

ANS.—A mining location properly made is as much a segregation of the public domain as any kind of a location of agricultural lands, and "A." would have under the U. S. law governing mining locations, until the last day of December, 1896, in which to do the

lature of the State of California, there was no statute requiring notice of mining locations to be recorded. Unless the district rules, the local customs of miners, or the state or territorial statute requires such notice to be recorded, it is not essential to the validity of a location that it should be recorded.

Vide:

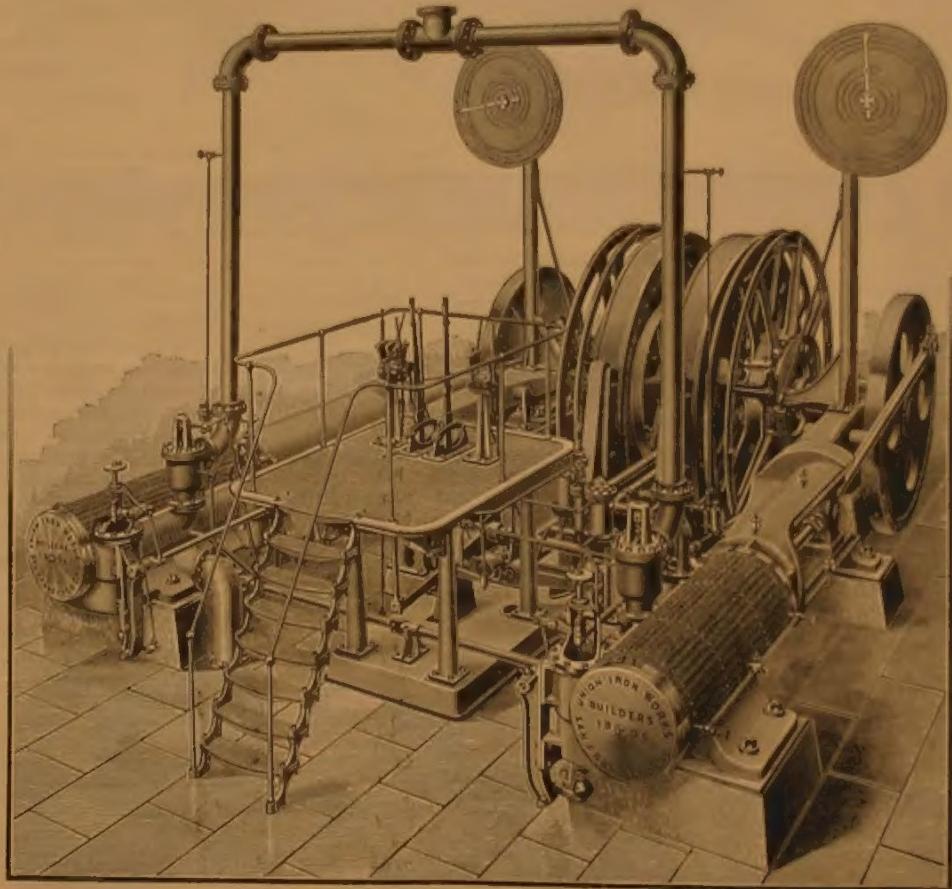
Thompson vs. Spray. 72 Cal. 528.

Golden Fleece Co. vs. Cable Co. 12 Nevada 323.

So. Cross Co. vs. Europa Co. 15 Nevada 384.

Jupiter Co. vs. Bodie Co. 7 Sawyer 114.

Since the new law of this state above referred to went into effect, it is necessary to record all locations.



HOIST ERECTED ON THE ONEIDA MINE NEAR JACKSON, CALIFORNIA

of America, Alaska, Mexico, Central and South America, Australia and Africa; thus, from their experience and facilities, they are in a position to produce the finest class of work with the greatest precision and dispatch.

This hoist is in successful operation sinking the shaft, which is expected to go about 2000 feet before cutting the lode.

The cylinder is 20x60, and the power of the hoist is 500 horse power, which is the largest direct-acting steam hoist erected on any mine in California at the present time. Self-acting dumping skips, having a capacity of two (2) tons, are hoisted at a speed that would not seem possible. The hoist is perfect in its operation and is giving splendid satisfaction.

assessment work required, and any entry or location upon his claim during this time is absolutely void, *ab initio*, and "B." takes nothing by his location—or work performed—and there being no privity between "A." and "B." in regard to the work done on the claim by "B." "A." cannot benefit by it—and "A." himself having failed to do the work or procure it to be done, his claim is open to location in January, 1897. "C." who has a valid location if properly made in January, 1897, has until Dec. 31st, 1898, inclusive, in which to perform the annual assessment work required.

With reference to the location notices of "A." "B." and "C." "having been recorded," we will say that prior to the passage of the act of March 27th, 1897, by the Legis-

The discoverer of the famous Drum Lumber mine, near Helena, Montana, was Mr. Thomas Cruse. In the days before he sold his property and returned to Helena a much honored millionaire, Mr. Cruse was locally known as "Old Tommy," and was looked upon as a somewhat visionary character. None questioned after a time that his mine, where he lived and labored alone, was valuable, but few placed its worth so high as did the patient owner. When he refused half a million for his claim, the people of Helena called him foolish, and when he turned away from the offer of a million, they called him a fool. But the miner was wiser than his friends, and eventually received his price, \$11,000,000, and a goodly number of shares in the new company.

The loader is manufactured by the California Wire Works, whose office is at 330 Market street, San Francisco, California.

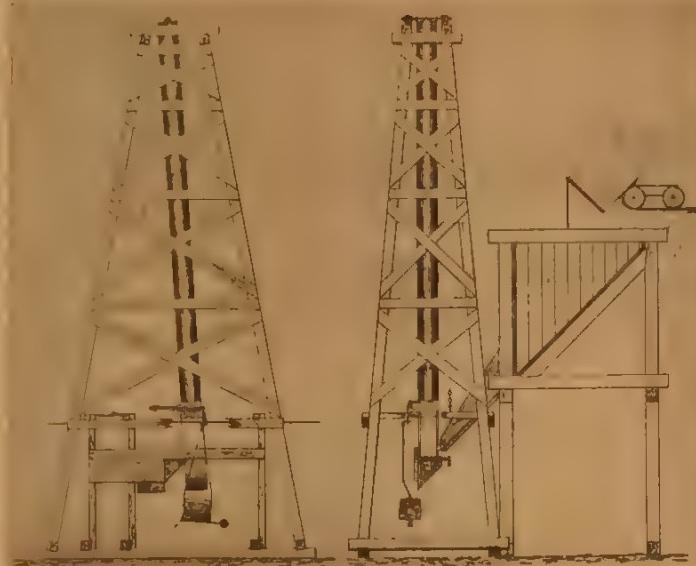


FIGURE 2

FIGURE 1

Mechanical Loader for Wire Ropeways and Tramways.

We illustrate one of the latest patents of A. S. Hallidie, of San Francisco, California, which is a device for loading the carriers of wire trams and ropeways.

Figure 1 is a side view of the loader, showing the ore bin, the chute, the pendulum with the loading box at its lower end and the ore carrier.

Figure 2 is a front view of the same, showing the pendulum and the loading box swung out from its resting place having discharged its contents into the carrier.

Figure 3 is an enlarged view of the lower part of figure 2, in which the essential parts are shown more in detail.

The apparatus is exceedingly simple and efficient and with the aid of one man can easily load 300 tons in 12 hours. There is nothing to get out of order and very little to wear out. It is placed in front of the ore bin from the chute whence it is discharged into a loader box at the foot of the pendulum.

The device consists substantially of a pendulum swinging on trunnions about 16 feet above the level of the moving cable. The pendulum is made from No. 16 sheet iron tubing 12 inches in diameter. At the lower end is attached a loading box which contains, when loaded, enough ore to fill one carrier of the ropeway. The loader box has two sides, a back and a sloping bottom; the front of the box is open. With an open front the ore dumped in would, of course, slide out immediately, but while the box is being loaded it is held between a guide and a fixed partition or bulkhead. The ore is thus held in a stationary position by a hooked latch which forms part of a tripping device consisting of a lever working on a fulcrum, and will be held there until the latch is released from its keeper.

The releasing of the loading box is done by the clip on the moving ropeway cable to which the ore carrier is suspended, and which as it moves along, strikes the end of the lever and raises the latch. This releases the loading box. At the time the loading box is re-

leased the ore carrier is immediately under the nose of the loading box ready to receive the contents of the box. The clip on the moving cable pushes the pendulum along in the direction of the travel of the cable and out from the partition and thus opens up the front of the loader box and lets the contents pour into the carrier. Both the loader box and ore carrier move together at the same speed for a sufficient distance to allow the ore to be discharged from the loader box into the ore carrier. The swing of the pendulum raises it sufficiently high to clear the rope clip and the pendulum with its loader box swings back in between the guide and the bulkhead ready to receive another load of ore from the ore bin.

Next Meeting of Mining Engineers.

The twenty-eighth annual meeting of the American Institute of Mining Engineers will be held at Atlantic City, N. J., beginning February 15, 1898.

Ample opportunity will be given at this meeting for the presentation and discussion of papers—which is all the more desirable, because the late Lake Superior meeting was so largely occupied with excursions and entertainments that the professional sessions were necessarily curtailed.

The Institute has under advisement a meeting in Mexico next October. It will be arranged if enough members express an intention to attend.

Mining Directory for 1898.

Poole Bros., of Chicago, are preparing their "Mining Directory and Reference Book for 1898. This will be a valuable work containing the corporation, lien laws and mining codes of the states, territories and provinces. The directory will contain a great amount of statistical information useful to mining men and manufacturers of mining machinery.

We have received information as to the Fulton power head, one of the most simple pumps on the market. It was invented by A. T. Ames of Galt, Cal., and is a great improvement over the other old ones, as you only need to slip off a cover and all the parts are then exposed to view, which does away with sending for machine workmen to repair it. It only takes a few minutes to do this and then it will flow as good as ever. It is so constructed that it will never freeze or burst, and altogether it is considered one of the finest of the kind in existence. The works and factory are at Galt, California.



FIGURE 3

CORRESPONDENCE

CALIFORNIA

TUOLUMNE MINES.
(From Our Special Correspondent)

Mother Lode.

THE ARBONA, TUTTLETON.

Main shaft now sunk 230 feet. Crosscut tunnel, or adit level, was driven 200 feet when main vein was intersected, from this point a raise was put up to surface, which constituted main shaft, being of two compartments, distance from adit to grass 180 feet, then sinking was resumed—a station being cut out at point of intersection, with vein in the adit level—shaft continued downwards. The vein at all points between walls, so far as opened up, shows a 7 foot vein, which mills on an average of \$7.50 to \$8.00 a ton. The rock shows free gold, the sulphurets are of high grade, assaying in places \$700 per ton. There are several levels run on the vein, north and south, aggregating 250 feet in each level exploited. The vein is found of uniform size—walls perfect.

The mill of 10-stamps has started up, the past rains affording the supply needed; the same will be kept continuously crushing on the rock that has accumulated in the ore bins and mines. There will be at times sufficient quartz to keep the 10 stamp mill fully employed, very shortly 10 more stamps will be added as the mine becomes opened up; such a course will be expedient and necessary.

THE RAWHIDE.

The above mine is now sunk to a depth of 1300 feet. The deeper the explorations are conducted the higher the value of the ore—drifting on this, the deepest part, proves the value of the assertion.

THE GREENHORN MINE

Is found to the east of Tarantula, has a good sized vein, with paid values. It is now being under purchase consideration and will shortly change hands.

THE TARANTULA.

The steam hoist at the Tarantula is nearly completed. It is a very perfect double cylinder hoist. The boiler is all nicely set in brick and the engine in concrete, and they expect to put in a cable in a day or two.

THE ALAMEDA.

The more this mine is developed the better is the showing. Drifting on the 500 feet level is still the order of the day; payable rock is daily brought to grass, that when a mill is built there will be large amounts of quartz ready for crushing, with a continuous supply for a 20-stamp mill. The sulphurets are of very high grade, containing a very heavy percentage of telluride of gold and galena.

All of the mines on the Mother Lode are now running with full force, and the mills also in full blast, except one or two waiting for the completion of electrical plants, their future power. By the first of the new year, there will not be an idle stamp in the county.

THE BELL MINE, AT TUTTLETON.

This mine is still demonstrating, by development, a splendid property—large ore body, showing free gold after every blast. A 40-stamp mill will be required in the spring.

The Middle Belt.

THE GOLDEN GATE SULPHURET MINE.

Seventy men are employed at the above mine. The new hoist is completed and found most efficient, and gives entire satisfaction. The chlorination plant is in full operation. This mine is a steady dividend payer.

THE GERRYMANDER.

This mine is sending to their mill some very good-looking ore—value in sulphurets.

There are several new mines in this belt: the Campbell, Flat, the Estrella, and several unnamed. The prospects in all are good. value in the sulphurets, which is more permanent than free gold mines.

East Belt Mines.

THE KETZ MINE.

The above mine is running full handed; rich rock is being uncovered; owners well satisfied.

THE RIVERSIDE MINE.

The Riverside mine, with a record of \$180,000 from former workings, has started its new 10 stamp mill. Twenty men are employed at the mine. This mine has ore reserves to last many years. Under the management of S. Plank, it is sure to come to the front again.

GREY EAGLE MINE.

G. W. Plummer and L. A. Engelke have sold the Grey Eagle mine near American Camp to Koble Brothers, of San Francisco. The final arrangements were made last week.

STANISLAUS RIVER.

Messrs. Storer & Shorey, of Horseshoe Bend, have developed a magnificent property of great extent. The rock shows free gold, vein from 14 feet to 80 feet wide. They have a water power of 3000 inches, sufficient to drive all machinery, mill, electric plant, etc.

ARGUS.

MEXICO

(From our Special Correspondent)

CIUDAD DE MEXICO, Dec. 18, '97.

The Sierra Mojada Company, operating in the State of Coahuila, has encountered a large body of lead carbonate ore in their Santa Esperito mine.

Mr. Carlos Eisenmann of this city, who is at present in Paris, sent a cable last week to the effect that the big deal for the transfer of the Inguaran Copper mines in the State of Michoacan to a French syndicate will go through. The price to be paid for these mines is \$3,000,000. The syndicate will construct a railroad from the mines to the Pacific coast. This is an immense concentrating proposition, requiring the erection of an extensive concentrating plant, the products of which will be shipped to Europe.

Several practical working tests will be made on the ores of these mines in the testing works of Heckelman & McCann of the City of Mexico, as soon as the same is ready to make tests to determine whether fine or coarse concentration will yield the best results.

The Santa Ana copper properties located in the state of Chihuahua will be developed on a large scale by a French syndicate. Their headquarters will be in the City of Mexico.

The properties of Mr. Albert Milliken in Durango are showing up well, and the Company contemplates putting in a leaching plant.

The Kansas City Smelting and Refining Company is putting up two 60 ton stacks on the silver-lead properties at Boquillas, near the Texas border. Mr. Wells, late of Chihuahua and Jiminez, will be the superintendent.

PACHUCA.

Miscellaneous Mining News.

ALASKA.

The Yukon Sufferers.

The House passed a bill, Dec. 16, appropriating \$175,000 for the relief of the people in the Yukon country. The Senate also passed a joint resolution appropriating \$250,000 for the relief of the Yukon miners. It will be necessary before either becomes a law for Congress to get together on a common basis.

Secretary Alger, Dec. 20, cabled to Wm. Akellmann, the government reindeer herder who is now at Alten, Norway, to inform the War Department how soon he can have the herd ready to aid in getting supplies to the miners in the Klondyke region. It is expected they will have to be transferred at New York to the railroad and in that manner carried across the continent, and again by sea up the Pacific coast to Dyea or Skagway, or some other point that may be selected as the base of operations by the expedition.

Ruby Sand Gold Mining Company.

Of which W. M. Brook is president and August Kiser superintendent, has been for several years engaged in treating beach sand at Lituya Bay, and claims that its works are the most extensive of the kind in the world. For four years past the output has averaged \$16,000 a year.

ARIZONA.

The Whetstone mines, belonging to Messrs. Loudon & Gaslen, have been bonded and will be opened and developed by Messrs. Harry & Sanders.

These men are well known mining men of long experience. When they looked over the property they immediately closed the deal. It is understood the figure is about \$20,000. By the terms of the agreement, a force of men will be put to work the first of the year.

This property has long been considered a fine one. From the ore on the surface, the miners say it will have a fine future.

The Sun Dance mill, near Prescott, has started up again.

By a deed filed for record last week, Henry Lang transfers all his interest in the Bullion Producer mine, Big Bug mining district, to A. B. Wilkins for \$1000.

E. H. Shakelford and A. T. Marsh have deeded to F. X. O'Brien all of their right, title and interest in the Fortuna, Pony and Minnie mines and Mr. Marsh also sells to same, boilers, engine, pumps, pipe line, etc., for the nominal consideration of \$1.00. A deed from D. O. Moore to Mr. O'Brien transfers all of the same property to the latter.—*Prescott Journal Miner.*

Just south of the Bent mines, in the Arriaga mining district, the Consolidated Oro Fino Mining Company is at work on several of their new properties, at present doing, you might say, prospect work upon their ledge, to locate at the best point a working shaft. On their Valley View mine, they last week sunk thirty feet on the ledge, which shows to be one of the largest and strongest ledges in this district, it being the full width of the shaft, and even wider in places. They are cutting out some very fine looking ore, which shows to be very rich in gold and silver.

G. S. Mulkey, secretary of the Jerome Mining Company, who has been in Denver buying machinery, says that the company's workings are now down over 600 ft. and a tunnel 1000 ft. long will probably be driven to cut the ore at water level. The property adjoins the United Verde.

Suit has been instituted by a British syndicate against W. C. Bashford and Daniel K. Keating, of Prescott, for \$50,000 damages. The syndicate claims that Bashford and Keating salted the Jersey Lily mine and caused their expert to make an exaggerated report on which they paid \$25,000. Aside from the \$25,000 paid on the property, they expended \$25,000 in development work and ascertained that they had been taken in. It is claimed by the owners that the suit is only an attempt to get possession of the mine without paying the balance due on the property.

Roscoe Kinsell, of Denver, Colorado, is in Kingman, Mojave county. Mr. Kinsell is one of the owners in the Buckeye mine, at Mineral Park, and is preparing to begin work on an extensive scale on that property. The small force now at work will be augmented and the hoist kept running night and day.

Robert Roscoe has reached a depth of forty feet with the shaft of the Blue Rock mine, four miles south of Kingman, and is getting out sixteen ounce gold ore.

The officers of the New Vulture Mining company are as follows: H. M. Love, of Chicago, Ill., president; Chas. B. Ayers, of Chicago, vice-president; Chas. F. Love, of Chicago, secretary and treasurer. The other stockholders of the company are: Joseph C. McKee, of Grand Rapids, Mich.; Isaac H. Tichenor, of Milwaukee, Wis.; and William C. Davis, of Tucson. The principal office of the company is located at Chicago, but a local office is also maintained at Vulture.

The gentlemen connected with the smelter proposition in Arizona, state it is now an assured fact that it will be erected as the first shipment of machinery is to be made in a week or two.

CALIFORNIA.

AMADOR COUNTY.

The Monte Christo, six miles north of Volcano, is rapidly developing into a big mine. An immense block of ore, averaging from \$12 to \$15 to the ton mill test, has been stopeed out. The shaft will be sunk 300 feet and a tunnel driven to tap the ledge. John McCall is superintendent.

KERN COUNTY.

The Little Butte at Randsburg has started up after making many improvements and is now running three shifts. The big engine is running about twenty three hours and sixty

minutes a day. The balance of the time the engineer devotes to rubbing her down and grooming her. Things look and sound decidedly lively over on Gold Hill.—Randsburg Miner.

RIVERSIDE COUNTY.

The Chuckawalla Mining, Milling and Water Company, with headquarters in this city is developing a group of claims, twelve in number in the Chuckawalla Mountains, Corn Springs Mining District. On the Sucker State, a shaft is now down 75 feet on an 8 foot vein and is being pushed with earnest. Another shaft is now being started on the vein from which a drift will be run at 50 ft. to meet the other. This is all in ore that mills \$20 a ton. On the Edina a tunnel has been run 150 feet on an 18 inch vein that mills over \$100. There is plenty of wood and water in the locality.

SAN DIEGO COUNTY.

The receiver for the creditors of the Golden Cross mine, at Hedges, has been doing much good work as he has paid \$10,000 of the debt of the mine which was \$750,000. Mr. Pauly, who is the receiver, states that the mine could be made to pay \$100,000 per year.

In the vicinity of Hedges and Ogilby, the new and important discovery which has been made has caused much excitement in the county. Miners and prospectors have located every foot of ground.

COLORADO.

The northern boundary of the Cripple Creek gold district has been extended three miles, by the discovery in Copper Mountain of an immense blanket vein of ore, running from \$10 to \$1,500 per ton in gold.

The Utica mine is again to the front with another big strike of fine ore.

The body of ore struck is four feet in width across its face, and is almost a solid mass of pyritic iron, with bunches of peacock matter scattered here and there. It is considered by the company, and all those who have seen the strike as extraordinary in its richness. The company is very much opposed to showing its treasures to outside parties; but this much was told by the manager, Mr. G. A. Davidson, after much persuasion on the part of friends. The average value of this ore is \$100 to the ton, and its quantity is almost inestimable. If the mine was situated in Cripple Creek, it would be considered a wonder, and always referred to by miners of Colorado.

The new matte smelter that Montana men are building at Jamestown, Boulder county, is nearing completion. They assert that they can profitably handle ore running as low as \$10 per ton.

December Dividends.

Ores and Metals of Denver publishes the following report of dividends disbursed for December:

The Portland Mining Company held a meeting the fore part of the month at which a dividend of 1 cent a share was declared payable Dec. 15. The total amount disbursed will be \$10,000.

The El Paso Gold Mining Company at a meeting last week declared a dividend of 1 cent a share, payable Dec. 15. Total amount thus disbursed is \$5,402.50.

The figures given out last week by the Isabella Co., covering the November production and earnings show that during last month the company shipped a total of 1,280 tons from its own workings, while lessees shipped 288 tons. The new smelter returns on this ore will reach fully \$30,000. The mine's operating expenses for the same period will be between \$21,000 and \$22,000. Speaking of the good showing made last month, one of the officers of the company said recently: "The production and earnings for November are due solely to the development work which has been in progress so long. This development is now beginning to bear legitimate fruits, and if the same ratio of development is held in the future, and we continue to open up ore as we have in the recent past, I see no reason why the company should not maintain its present production."

GEORGIA.

W. M. Kelly, of Atlanta, Ga., has leased the Cornelius slate quarry, near Cedartown, from W. O. Cornelius, and is putting in machinery to work the deposit.

The Greater Pittsburg Gold Mining Company, recently organized, has bought a tract of 440 acres, near Hiawassee and will begin development work at once. The capital stock of the company is \$100,000. The officers are: President, G. A. Kline, Freedom, Pa.; secretary and treasurer, J. N. Dawdelle, Rochester, Pa.

IDAHO.

R. Bell has some specimens of coarse, free gold ore that he got from the Combination claim on Carmen Creek. They are very rich, would assay fully \$50,000 per ton, and were taken out while doing assessment work. Mr. Bell says the vein is four feet thick and averages \$10 per ton in gold aside from the specimens.

The Petit Mining Company, after a very successful trial run, at Atlanta, has suspended operations for the winter. Mr. Frank Coffin, of Boise, and former State treasurer, is heavily interested in this property. It is on the main Atlanta vein, and could easily be worked for a long time. Many of the old miners that worked Carmen Creek some time ago, and under the same management are apt to be getting the same results.

Considerable work is being done in a small way in the Snake River placer country near Mountain Home this winter. The gold is very fine but in spite of that it is being sold with fairly good results by several miners. The placer pay streaks are numerous. Both on the Snake and the South and Middle Boise rivers are good. The Snake is being worked probably 12 months of the year. The Boise River can be worked nearly nine months.

The Blackstone Mine

Near St. Charles, eight miles south of Pocatello, is an excellent place for a forest, well supplied with a great variety of timber and other necessary materials. The property, with 140 acres, is owned by the Idaho Company of Salt Lake. It produces a low grade

galena ore, running about 75 per cent. lead and a few dollars in silver and gold. There is about \$6,000 of ore on the dump, and two shafts are being run.

J. N. Stacy has purchased a 40-foot gold quartz claim on Charley creek, known as "the Klondike," also the "Pioneer No. 2," on Mussel Shell, adjoining Frank Peters' claim. The former assays \$10.33 per ton, free milling, and the latter assays \$150 per ton, also free milling.

A recent cleanup of the "Crescent," after an eleven days' run of a five-stamp mill produced 234 ounces of gold, worth \$3,712. This property was formerly owned by Dunn Bros. & Carr, but has been recently purchased by Geo. B. McAulay and associates.

The five 850-lb. stamp mill for the Hi Yu mine in the Florence district of Idaho, has been set up and is running full time, with excellent results. This was the first mill built by the company and with the success so far attained, other mills are now in course of construction. These will be kept in stock, so that they may be in a position to supply any immediate demand without delay.

MICHIGAN.

The old Winona property, some 20 miles southwest of Hancock, was sold at public auction recently by Circuit Court Commissioner Shelden, for \$13,500. It was bought by Matthew M. Van Orden, trustee of the property.

The United Alkali Company of England has taken an option on the McGraw property near Bay City, in Bay county, which contains 16 salt wells ready for operation, and salt block with two vacuum pans. The company's agents are about to prospect for coal in the vicinity of the salt works.

The exploration work of the Baltic mine goes on as rapidly as possible. Though reports have been circulated that the crosscut has found the hanging wall and shows the vein to be 45 ft. wide horizontally, yet late news from the mine is to the effect that the exact width of the ore body is still undetermined. The length of the lode is also a matter of conjecture, though there are rumors to the effect that stamping rock has been found for a distance of 600 feet.

Michigan Mining Company has been organized by Capt. Jos. Sellwood (vice-president of the Minnesota Iron Company) John McKinley (discoverer of the McKinley mine on the Mesabi) and Everett Ball, of Marquette, to operate the old Belt Copper Mine in Ontonagon County, Mich., which was idle for a score of years. Mr. Ball secured possession of the mine at tax title for \$350, and has been confirmed in his ownership by the courts, and it is now the intention to open and develop the old mine, which can probably be done at a profit by the new methods and at the present prices of copper. Captain Sellwood is president of the new company.

Hoisting of copper rock from No. 4 shaft of the Wolverine is in progress. Power for the drills in the mine is furnished by a Rand compound compressor of the latest type.

MISSOURI.

Manhattan Mining Company has put in a large Palmer steam sinking pump, which throws 1,500 gallons per minute. Men are drifting at 183 ft. on a large face of zinc ore in open ground. They will sink the pump shaft to 250 ft. This mine has been one of the largest producers of zinc ore in the district.

Star Mining Company on the Chatham lease has started work after a shutdown on account of water for over a year. The mine was one of the largest producers on the Chatham lease.

Hollingsworth Mining Company has leased 50 acres one mile north of Jackson station. On this lease there are about 20 prospect shafts going down. The ore is found 75 to 105 ft. in open ground, with enough water to wash the ore. This lease has been producing ore for several weeks.

MONTANA.

The Western Mining World announces that the United Smelting and Refining Company, lessee of the Broadwater mine at Neihart, has concluded to postpone construction of the tramway at that mine for several weeks, and possibly until spring. There is no intention to abandon the improvement, but the weather has been so unfavorable that it was concluded to defer building. The mine will be worked constantly, but with a comparatively small force.

Word has just been received from Castle that a large body of ore has been struck in the Cumberland mine. We also learn from the same party that good bodies of ore are also being shown up in the Yellowstone, Great Eastern, Jumbo and the Judge mines, and all the people of that locality have great prospects of their coming to the front.

Yellowstone Placer Mining Co. have filed articles of incorporation. The company is going to build one or more dredging machines to work the river beds and the gravel and sand bars of the Yellowstone and other rivers in Montana. The company is capitalized at \$50,000, with main office at Rosebud in Custer county.

NEVADA

At the Chainman active work is in progress. The management is erecting a mill. The ore averages about 15 in gold per ton.

The Robust at Ely is being developed, and has a shaft 75 feet. At that level they uncovered 5 feet, showing \$12.50 per ton in gold.

The Jupiter at Ely has a shaft 60 feet and ore running \$18 a ton. Next season a mill will be erected. D. Peters & Co., Ely, are the owners.

The mill of the Austin mine is running smoothly, and December has shown the best production for the year. Some 155 tons have been shipped since the first of December, of which 50 tons were crude.

NEW MEXICO

The other day the gang at work on the Bland end of the Albemarle road, in making a deep side cut on the Pino mining claim, opened up and crosscut the top of a 15 foot lead of quartz that displays every indication of carrying exceedingly high values in gold. The Pino, which lies just east of the Posey and above the school house, is the property of George Hofheins, Ed Smith, Ed Lembke and M. L. Cole, who, it is declared, will immediately take steps to develop the new and undoubtedly rich discovery.

A variety of crystallized lead ore has recently been found in the Rex mine here which is new to the scientists. It is a silicate of lead with also some iron and it will be known hereafter as Robinite, being named after Geo. E. Robin, one of the owners of the mine.

A force of men is at work on the Lone Star mine and new chutes are being built and other improvements are under way. Last night a night shift was added to the regular day force and developments will be vigorously pushed.

John Butteck is sinking on a five foot chimney of gold ore in the Freiberg mine and intends to yet out at least 500 tons in time for the completion of the cyanide works.

Output of Hillsboro gold mines for the week ending Thursday, Dec. 30th, 1897, as reported for *The Advocate*:

	Tons
Wicks	30
Butler	5
Richmond.	20
Happy Jack.	5
Snake Group	50
Opportunity.	20
Sherman	5
Prosper	5
Eighty five	5
Rex (silver-lead)	5
Total	150

Total output since Jan. 1, 1897 - 9,304.

A New Corporation.

The Colfax Gold Hill Mining Company has been incorporated by A. M. Barnes, T. M. Irvine and J. W. Gallup. The corporation is formed for the purpose of purchasing, leasing, acquiring, owning, working and operating mining claims and mines of gold, silver, copper, nickel and all other kinds of mineral and quartz, and to own, operate and maintain all necessary appliances and machinery necessary for successful mining operations. Capital stock, \$1,500,000; principal office of the corporation is located at Cleveland, Ohio, and the principal place of business is designated as Elizabethtown, N. M.

OREGON.

The Black Pocket mine, owned by J. J. Jewell and Davidson Bros. in Missouri Flat district is doing well. The shaft is down about 25 feet and shows good ore. The rock so far taken out has paid \$100 to the foot, which is exceedingly good.

The old McKee mine is the Forest Creek district near Ashland, bonded by Crippen and Kennedy, will resume development work at once. They succeeded in running 175 feet on the ledge last season and were so encouraged that they resumed work.

Burnham & Main of Portland last week purchased the Boggs placer on Elliott creek, and have already taken possession of it.

The second addition of stamps for the Shorty Hope mill near Ashland, have been received, and it is said ten more stamps will be put in if the ore body justifies doing so.

Mr. A. W. Silsby who is at the lower Illinois, says both of the mines in charge of himself and Fred Franks are in full operation. A nugget worth \$4 was found, and he sent it to the elder Franks as a specimen of Oregon gold.

SOUTH DAKOTA.

The Homestake Mining Company have paid two dividends, one the regular monthly of 25 per cent, and the other an extra 25 per cent, making the total amount paid out \$62,500. Last year the company paid \$437,500, which now makes a grand total of \$6,525,000 paid up to date.

Development work has been commenced on a copper prospect near Custer Peak. A shaft is down 60 feet, and a vein of copper is exposed. A part of the claim has recently been sold to Chicago parties, who are interested in the Two Bit mines, for \$5,000 cash. The ore is said to run about 12 per cent copper and \$4 gold.

UTAH.

The Silver King Mining Company has just declared a dividend which was a surprise to its stockholders. It came as a Christmas gift. The amount was \$37,500 or 25c. a share.

The Silver King has already paid its regular monthly dividend for December of \$37,500, and with this extra \$37,500 it makes a grand total of \$75,000.

During the year the company declared thirteen \$37,500 dividends which now makes in all \$487,500.

It is not four years yet since the company declared its first dividend and during this period thirty-six times it has distributed between its stockholders \$87,500, amounting up to date to \$1,350,000.

The Silver King is known as one of the finest silver lead producing mines in Utah.

The showing for December of the following mines show, notwithstanding the depression in the metal market, that they have enriched the world as follows:

Ontario.....	\$112,500
Silver King.....	75,000
Mercur.....	36,000
South Swansea.....	7,500
Swansea.....	5,000
Utah.....	1,000
Chloride Point.....	5,000

This makes the total for the month \$242,000 to say nothing of the private corporations and individual mine owners.

The Ajax mine has just struck a six foot body of solid copper ore, and of much higher grade than any ore yet discovered on this property. This is saying a good deal as the property is known for its rich deposits of copper and gold ore.

The company now has made enough money to pay off its mortgage on the mine beside enough for the current expenses of operation. This is a good Christmas gift for the company.

WASHINGTON

The Bullion Mining Company, who own six claims on the Colville Reservation, eight miles west of Northport, have let a contract for sinking their shaft 50 feet further. When completed, this will make a total depth of over 100 feet. The vein shows 12 to 15 inches of solid galena, averaging 40 ounces silver and 75 per cent lead. The width of the lode, as already determined by the work, is fully 20 feet.—*Spokane Miner and Electrician*.

Both the Mother Lode and the Helen E. properties, in the Pierre's Lake district, will push development work during the winter. The Little Giant is an adjacent property upon which considerable work has been done, with good results.

FOREIGN MINING NEWS

BRITISH COLUMBIA.

It is stated that H. L. Symons and parties represented by him intend erecting a smelter at Nakusp. This is the Mr. Symons who applied for a bonus from the City of Vancouver for the erection of a smelter there.

The Reco Mine Company is about to declare another dividend of ten cents a share and then distribute profits to the extent of \$100,000.

The main shaft at the Le Roi has reached the depth of 600 feet, and will be continued to the 700-foot level. The ore being taken out is mostly from the 450, 500 and 600 foot levels. It is expected that from this time forward the output will be about 2000 tons a week. Twenty-two drills are at work. Last week 1,080 tons were shipped. This mine is said to be the finest and largest producer in Cavado, and, besides putting up buildings and machinery, have built a large smelter and paid \$625,000 in dividends. The mine is held at \$5,000,000.

The Le Roi will sink its main shaft to the 700-foot mark. New cables will be put in, as also a new pump, with a capacity of 200 gallons per minute. Ore shipments continue daily.

The Wynstay, Burton and Maple Leaf claims, on Elk River near Wardner, have been bonded to some eastern people by the owner, Mr. George Watson, for the consideration of \$15,000.

Slocan Developments.

News comes of one of the richest strikes in the Slocan, viz: on the Arlington. They have 12 inches of clean solid ore, which was struck in the lower drift, 160 feet from the surface. Assays run 1191 oz. in silver, and 43 per cent lead. On the strength of the report the stock is now in great demand, several sales being consummated. Treasury stock is held at 12 cents.

Messrs. Russell & Co., of Portland, Ore., manufacturers of Engines, Boilers, Saw-mills, etc., will remove on or about Jan. 1st, 1898, to their new and well constructed warehouse, which is now being erected at the corner of Belmont and East First streets. They will now be in a much better position to handle their increased trade.

GENERAL NEWS

To Prevent Mine Accidents.

Mine Inspector Byrne, of Montana, makes report in which he says: "Unlike most other callings, the security of the miner is largely dependent upon the care and prudence of his fellows, but so wide is the character and disposition of men that, in order to obtain unity of action from large numbers, the necessity of subordinating individual plans and methods to a well organized general system must be evident. The duty of the superintendent does not cease when he furnishes means of safety and issues instructions. He should see that the one is properly used and the other implicitly obeyed, and in no instance should he allow the subordinate officials to jeopardize the safety of those in his charge."

"Opposition has been manifested to the law requiring the enclosure of safety cages in vertical shafts. The purpose of the law is to protect the miner against the various dangers encountered while being lowered in or hoisted out of the mine. The necessity of it is shown by the number of lives sacrificed while riding in open cages in the past. With a few exceptions, the law had been complied with. Conditions existed in those exceptions which made it nearly impossible to comply with it within the time specified. A degree of indulgence has been exercised in this matter, in the hope of removing certain prejudices existing among a considerable number of employees as well as a few mine owners; also to allow time in which to complete improvements and changes planned previous to the enactment of the law. I am convinced that reasonable leniency is the better policy as against arbitrary enforcement. Sufficient time has now intervened to demonstrate the feasibility and advantage of the measure, by pointing to its successful application elsewhere. Now that these conditions which formerly operated against the immediate enforcement of the law have practically disappeared, proper steps have been taken to secure its rigid observance in the near future."

For Deep Mines.

Deep mining promises to be the rule in Leadville, and during the next year a number of deep shafts are to be sunk to catch the rich ore deposits uncovered in the 900 foot shaft of the Mab. The lessees of the Mab have commenced sinking again to get under the ore body, and will not commence shipping until the extent of the ore has been shown. S. G. Collins, manager of the Rialto Leasing and Mining Company, which has secured leases on the Chestnut, the Walnut, the Iron Queen and the Pyrenes, said: "We have some of the best property on Iron Hill," and every dollar invested is from Boston. The shaft was down 650 feet when we leased the property, and we have let a contract for 500 feet further, which is being sunk now at the rate of five feet per day. We have put up a plant of machinery and buildings at a cost of \$7,000 and we propose to go down until the underlying wealth of the camp is demonstrated in our ground. We have the example of the Mab to guide us and are prepared to thoroughly exploit our territory. The fact that we have all the money raised to sink to the depth at which we expect to find ore, is proof that the company has confidence in the district. The existence of a rich body of sulphide ore at a great depth has long been suspected and now that it has been shown, deep mining will be the rule in Leadville.—*Mining Investor*.

Michigan Iron Mines.

The independent mine owners—those corporations of moderate capital and medium sized mines—are feeling much better over the prospects for 1898. They should remember that they are not out of the woods yet and will do a shrewd stroke of business for their shareholders if they sell out, bag and baggage, during the good times that promise to prevail in the iron mining industry for several years to come. The handwriting on the wall bodes no good for the smaller operators and such of them as are not exceptionally well situated and very cleverly managed must eventually go under in the competition with larger and more powerful neighbors. When the situation resolves itself into the survival of the fittest, as it eventually must, the corporation owning railroads and fleets of steel steamers, having close furnace connections and rich mines, is bound to crowd out the smaller competitor which has nothing but a mine.

The Murray Iron Works Company of Burlington, Iowa, closed the year with some heavy shipments of machinery which wound up a number of 1897 contracts and cleared the decks for 1898. Among the engines and boilers we note the following:

One 700 H. P. cross-compound, direct-connected Corliss for a Texas street railway.

One 450 H. P. Corliss for a Missouri municipal lighting plant.

One 350 H. P. Corliss for a Nebraska packing house.

One 150 H. P. Corliss for a Colorado stamp mill.

One 150 H. P. Corliss for an Iowa municipal electric lighting station.

One 75 H. P. Corliss for a South Dakota flour mill.

Four 70 H. P. high pressure boilers for an Iowa water works.

One 70 H. P. for a South Dakota water works.

One 70 H. P. high pressure boiler for an Iowa electric light plant.

One 60 H. P. for an Iowa flour mill.

Three 80 H. P. boilers and three 40 H. P. boilers and several hoisting engines for western mining camps, and several carloads of mining machinery for Mexico.

The entire plant has been operated full time throughout the fall and the Corliss engine works and boiler shops have been run overtime.

Messrs. Smith & Irving, assayers and refiners of this city, have just sent us their Miners' and Prospectors' Guide. It contains the latest mining laws and regulations besides water rights and many Supreme Court decisions on mining. It explains about the different ores, how they are treated and their commercial value. It is a book any miner or man interested in mines needs. It will be sent to any address for postage, four cents in stamps.

Notes About Drills.

In preparing coal mining bits for chain machines, forge the bits into shape, then allow them to cool to a black or to grow cold; now reheat to a low, even red and harden in clean, fresh water. Draw to a blue; put them into service and you will be repaid for the extra care by their durability. They may not cut "sulphur balls" but will try to.

Some of your forges are in a very bright light and the heat runs up without your being aware of it.

In long drills susceptible to springing, increase the thickness and you will do away with the trouble.

The payment of heavy dividends by mining companies during the month of December has given quite a stimulus to the mining industry throughout the state and people are beginning to realize more and more that the imperishable wealth of this country comes from the mines, and especially those who have been the recipients of dividends during the month.

The Weber Gas and Gasoline Engine Co. of Kansas City, Mo., have made recent extensive improvements to their already large plant. They have just completed an addition to their shop which includes a fully equipped testing room with a capacity of testing 12 engines at one time, a large shipping and salesroom and doubling their office capacity. By relieving the machine shop of the testing and erecting part of the work they have practically doubled their capacity.

The Murray Iron Works of Burlington, Iowa, has brought suit against R. G. Dun & Co. for false reports published in their journal. Dun & Co. reported the Murray Iron Works as having given a deed to preferred creditors, while as a matter of fact, the Murray Iron Works had simply filed a trust deed to cover the issue of bonds to secure funds for the extension of their business. This company has no debts and no creditors, consequently can prefer none.

The committee in charge of the Golden Jubilee is receiving hearty support in its efforts to make an imposing display at the fiftieth anniversary of the discovery of gold. Various societies, including the Society of California Pioneers, have promised financial aid, and many subscriptions have been received from private individuals.

American Dynamite in South Africa.

From Cape Town, South Africa, Consul Roberts writes: "Such an important position does the dynamite trade occupy today in that part of Africa, south of the Zambesi, that peace in the Transvaal, it might be said, depends much on its regulation. The first suggestion mentioned by the mining commission, appointed by the Transvaal Government, some time after the Jameson raid, to investigate the alleged grievances of the Johannesburg Uitlanders, was to lower the tariff on dynamite. This, the commission believed, would go far to conciliate the influential element on the Rand, mine owners, shareholders and mining engineers. It was the almost prohibitive duty on dynamite that incited the better class of Americans, who form a vast majority of the mine managers, engineers and experts at Johannesburg, to take part in the Jameson fiasco. It was due to these men also that American dynamite was introduced into South Africa, until now the United States furnishes more than any other country to this portion of the world. It is satisfactory to note, however, that this steady growth may be ascribed to the superior quality of the American goods, which is attested to by nearly all mining men on the Rand, irrespective of nationality. This is shown from the fact that dynamite can be delivered in the Transvaal from Hamburg, including cost of importation and duty, at 37s. 7d. (\$9.39) per case, and from Dr. Nahnsen's factory for 46s. 1d. (\$10.87), while the rate from America is 47s. 7d. (\$11.22), but the

latter country, nevertheless, has the call on the trade. The cost from Cornwall is 52s. 1d. (\$12.33) per case. The quantity of dynamite and other nitroglycerine compounds landed at Cape Town from abroad, in the year ended December 31, 1896, was 55,000 pounds, valued at £791, or \$3,955. Dynamite and blasting compound powder (practically all the former) was imported into the colony during the same period to the amount of 12,327,540 pounds, valued at £538,245 (\$2,619,225). Of this amount, 1,301,210 pounds were entered for consumption under the union customs act prevailing in Cape Colony, Orange Free State, Basutoland and the Bechuanaland protectorate, while 10,940,013 pounds were for transportation to the South African Republic and Rhodesia, an insignificant portion being shipped to the latter province.

"The duty on blasting compounds for consumption in the countries included in the customs union is 3d. (6 cents) per pound. On that entered for transportation to non-union countries a transit duty of one-half of 1d. (1 cent) per pound is levied.

"Immediately on the discovery of gold in the Transvaal, dynamite came into great demand, and a syndicate, seeing the opportunity for immense profits, obtained a concession from the Government to manufacture the explosive. This developed later on into a monopoly, for, when the mine managers objected to the Transvaal article, which was manufactured from ingredients procured in Germany, the duty on the imported article was raised to what was expected would prove a prohibitive rate. The top rate reached was 9d. (18 cents) per pound. Figuring on the rate per pound as 1s. 9d. (42 cents), and including the transit duty, and other details of shipment not counted in the computed total, the cost of the article delivered at Johannesburg is just double the wholesale cost at Cape Town.

"Many mines preferred to pay the exorbitant rate and get the American article, but there was enough demand for that manufactured in the Transvaal to cause a great rush, and when the syndicate found they could not put the imported ingredients together fast enough, the manufactured article was imported straight from Germany and entered, of course, free of duty."

Winning Nickel by Electrolysis.

Nickle, standing metallurgically between iron and copper, can be won by methods analogous with those proper to both the latter metals. Thus sulphide ores may be run to a matte, and oxide ores directly reduced to crude metal. A similar relation is evident in the behavior of metal when treated by the wet methods of extraction, which resemble those for copper. Although this process will not serve for the direct precipitation of metal, its similarity to iron prevents such easy reduction. Since electrolysis has been brought to bear upon the winning of copper, and with so great a measure of success, attention has naturally been turned to the production of nickel by the same or allied processes, but hitherto many difficulties have been encountered. However, the advocates of electrolysis are so steady in their determination to overcome these difficulties and make electrolytic processes commercially possible, that already the production of nickle in this way can almost be considered as a recognized process of manufacture. Foremost amongst those who have engaged their attention upon the production of nickle by electrolytic methods is F. Poerster, whose papers in the *Zeitschrift für Elektrochemie* have attracted much attention. In a

recent issue of the *Zeitschrift*, vide No. 4, pages 160 to 165, Foerster describes experiments made with carbon as anodes, but it seems that he did not obtain very successful results for the carbon employed very quickly became soft and broke down in the hot nickel chloride solution. It is possible, however, that better grades of carbon might yield more satisfactory results, especially if lead peroxide be used as the anode, and the solution worked with a sulphate.

Most of Foerster's recent work, however, has been carried out with soluble nickel anodes. This is, of course, the method used in the electroplating of nickel, but hitherto only thin coatings of the metal have been obtained, the metal soon becoming scaly and parting from the electrode. This is a difficulty which every one is familiar with who has ever done any electroplating with nickel, but Foerster states that it can easily be overcome by keeping the temperature of the electrolyte at anything over 50 and up to 90 deg. C., in which range he has succeeded in forming tough deposits of the metal both from solutions of the sulphate or the chloride. On the whole, Foerster prefers the solution of the sulphate, and he works with a concentration equivalent to 145 grammes of commercial nickel sulphate per liter at temperatures between 50 and 90 deg., and with current densities varying from 0.50 to 2.5 amperes per square decm. A higher current density yields a lighter and smoother metal. With the same current and more concentrated solutions of nickel sulphate (equal to 100 grms. of nickel per liter) the metal was deposited in a dull, rough state. It seems that with an increased concentration denser current is required, for, from the solution last referred to, the metal was obtained at the cathode in a bright, silvery-white condition, using a current of between 2 and 2.5 amperes per square decm. The cause of the irregularities and roughness noticeable in the deposit is due to the formation of bubbles of hydrogen at the cathode, which tears up the surface.

In a large scale experiment, 0.50 kg. of nickel was deposited upon a cathode of 2 square decm. superficial area. The solution used contained 100 grms. of nickel per liter; the current density employed was 1.5—2.0 amperes; the temperature was maintained at 60 deg. C.; and the EMF. required, with the electrodes at a distance of 4 cm., was between 1.0 and 1.3 volts. The nickel obtained was exceedingly tough, and the author concludes that, using hot solution, the electrolytic deposition of nickel upon any scale of operations is possible. The composition of the deposited nickel is effected by any iron and cobalt which the crude metal may have contained, and the separation of these three metals is not possible by alterations of the *n.m.r.* and current density, unless the nickel solution be treated with tartaric acid and an excess of sodium hydrate. Working with a solution of nickel chloride, it was found that the difficulty of producing a firm, tough deposit from the cold situation was not eliminated when the solution was heated, for under these latter conditions basic chloride makes its appearance at the cathode. However, Foerster did succeed in preventing the currents of this impurity by adding to every 100 cc. of electrolyte 0.25 grm. of hydraulic acid. Under these conditions very satisfactory deposits of nickel were obtained from solutions containing 5 to 12 grms. of metal per 100 cc. at temperatures ranging from 50 to 90 deg. C., and by means of currents ranging in density from 0.70 to 3 amperes per square decm. The

greater the current density and the degree of concentration of the electrolyte, the tougher and lighter in color was the deposit. In his paper Foerster describes the character of some of the alloys of nickel and iron obtained in attempts to deposit nickel electrolytically from solutions containing much iron. Other experiments are also described, and on the whole this last paper of Foerster's may be regarded as a useful contribution to our knowledge of the subject.

The Alaska-Treadwell Mining Company, of San Francisco and Douglass Island, have purchased through J. A. Lacy of San Francisco, Cal., of the Stetson-Post Lumber Company of Seattle, five million feet of lumber for the erection of two new stamp mills on the famous Treadwell mine in southeastern Alaska. The amount of lumber required for immediate delivery is about 2,000,000 feet. Of this there will be 1,600,000 feet of dressed lumber. The balance will be heavy timbers, running as large as 18 by 24 inches, thirty-three feet long. The heavy timbers will be framed at the yards of the Stetson-Post mill, by workmen engaged by the Alaska-Treadwell Mining Company. The lumber will be shipped from Seattle to Douglass Island. Shipments will begin about the first of February.

H. N. Maguire, president of the Lost Cabin Gold Mining Company, is about to start east to purchase a milling, concentrating and cyaniding plant for the Lost Cabin and the Transvaal, contiguous claims owned by the Lost Cabin Company, near Wolf Lodge, Idaho. L. C. Waller, one of the trustees, will probably accompany the Judge on his eastern trip. "We expect in a few months to show the product of a five or ten stamp mill, with the latest gold-saving appliances. We expect to accomplish results with this plant such as would be expected only from a much larger mill," said Mr. Maguire.

Electric Furnaces.

Many kinds of electric furnaces have been suggested from time to time for the manufacture of calcium carbide and other similar products, but they have all shared the same defects: these are that the process is not continuous, the operation having to be stopped and the furnace allowed to cool before the manufactured product can be removed, and also that the product contains a certain amount of the raw material from which it is manufactured. The usual plan is to have the lower electrode consist of an iron plate or crucible which is fixed, while the upper electrode is formed of carbon and is movable, being raised as the charge is fed into the furnace. The consequence of this is that the resistance and therefore the voltage, is constantly varying, and that the fused calcium carbide or other product is subjected to the action of the current whilst fresh material is being brought into the action of the arc, and the manufactured product is not always as uniform as could be desired.

These defects Mr. W. S. Horry has set himself to overcome, but with what prospect of success experience obtained by manufacture on a commercial scale can alone determine. Mr. Horry constructs his furnace in the form of an open hopper of firebrick, suspended from two standards, so that its lower end hangs just over the space between the two carbon electrodes in which the arc is struck, and between the flanges of a rotary spool or

reel, to which movable cover plates can be attached, slots being formed on the peripheries of the flanges for this purpose. The carbons rest on the fireproof material of which the hopper is constructed, and their electrical connections are protected by it from the heat of the furnace, the edges of the carbons being bevelled so that they present vertical surfaces to the space between them. The length of the arc is thus kept constant, and does not vary as in most other forms of furnace. The mixture of coke and lime is fed into the hopper, and is converted into calcium carbide in the arc, and when the ammeter shows that the current rises, the spool is rotated to remove the product from the furnace. The action of the furnace is thus made continuous, fresh material being fed into the hopper as that converted into calcium carbide is removed in a plastic sheet, the reel being rotated as required until it is nearly full, when, by lifting off the cover plates, the portion of calcium carbide first formed can be cut off.

PERSONAL NEWS ITEMS

MR. W. WALKER of the Boston Panorama Milling and Mining Company, of Victor, Calif., called at the JOURNAL office last week. They are putting up one of the finest ten-stamp mills in this section of this country to do all kinds of custom work. The mill will be in running order on the 20th inst.

Lew E. Aunury, the mining engineer, has returned from a trip through eastern San Bernardino county. He reports a snowfall over a large section of territory—and a Klondyke climate, etc.

E. Davis, who formerly ran the Esmeralda mine in Calaveras county, has been appointed superintendent of the Dead Horse mine at Summersville in Tuolumne county, Cal., in place of Mr. Thomas who has held that position for many years.

GEORGE W. KOSTER, the well known mining man, arrived in Kingman, Arizona, from Los Angeles, Cal., last week. He will probably engage in mining in that country.

L. LINDSEY of Nogales, Ariz., made the JOURNAL a pleasant call the other day. Mr. Lindsey will remain in Los Angeles a few weeks before returning.

GEORGE BLAKE, superintendent of the Bell mine in Tuttletown, California, is stopping at the Waldeck Sanitarium in San Francisco, Cal.

E. C. PRATT, resident of New York City and associated with J. W. Mackay, is said to be the pure of the Grand Reef mine, fifty miles north of Wilcox, Arizona.

J. P. CALP has been appointed superintendent of the Chihuahua Mining Co.'s mines near Chihuahua, Mexico.

L. E. PORTER, the noted cyanide man of Los Angeles, was a caller at the JOURNAL office last week.

MR. L. A. DOCKERY, a mining engineer from Santa Eulalia, came to Chihuahua, the fore part of last week, for a visit of a few days.

Edward A. Tast, representing Poole Bros.' Mining Directory, published at Chicago, Ill., paid the JOURNAL a very pleasant call the other day.

Manner G. R. Bothwell of the Sacramento, who has just returned from an inspection of that mine, states that he is more pleased with it than ever before, and that new bodies of good milling ore are constantly being disclosed.

CLARENCE S. KING, the well known mining expert, who has had more practical experience in mines than a large majority of experts in the country will live in a few days for Fairmont, W. Va. He will probably outfit for Klondyke in a few days, as we expect to hear of his return with a large load if there is any to be made in that frozen and isolated land.

T. L. STRINGHAM, who has been mining in the Greenhorn mountains in Kern county, Cal., was a caller at the JOURNAL office last week.

MINING STOCK MARKETS.

LOS ANGELES, CAL., Dec. 30, '97.

The market is now beginning to experience the usual holiday inaction. A small run of business is in progress, and some consideration is being given to the requirements for the early part of 1898, but as a rule there is not much offering in the way of fresh business.

Brown Lake is making a good showing. East Amargosa has been selling at \$1.00 per thousand and has been making slight advances. Gold Bug has attracted considerable attention. Blocks of Gold Bug stock were sold at \$8.00 per thousand. One of the best stocks on the market is Mohawk Acton, and buyers consider they have a good bargain.

Magganetta stock does not seem to be very active. Pacific Consolidated of Red Rock, Kern County, Cal., has been quite a feature on the exchange this week. Stock was selling at \$3.25 per thousand, and a great many thousand shares changed hands. Wedge is also picking up, having sold some nine thousand shares at \$2.50 in one day. The market will in a few days show an improvement.

Southern California has a bright future, and Los Angeles is the most central point of a rich mineral country, and no doubt, the Exchange has the best location obtainable, and will prove a grand successful enterprise.

SAN FRANCISCO, CAL., Dec. 29, 97.

The market has been declining, and, from present conditions, will still go lower, when it is expected it will make a firm advance. Few thought in 1870 that there was any ore in Crown Point or Belcher on the Comstock, below the depth they were then working, but the largest value of metal from those mines was subsequently discovered and removed and dividends paid. This caused more persistent work elsewhere which led to the large ore deposit in Con. Virginia and California, from which large dividends were paid, and sent the shares of twenty-three leading mines from about \$5,000,000 to over \$270,000,000. Two years after the highest prices, the same mines sold down to \$30,000,000, only to recover to \$114,500,000 in the Sierra Nevada deal, which sold up to \$280 a share. Preceding the Con. Virginia deal in 1886, the shares of the twenty-three mines sold on the basis of about \$1,500,000. When the deal was at its

height they sold at over \$40,000,000. These are only given to show that the Comstock mines have as many lives as the proverbial cat, and least looked for, the shares go from absurdly low prices up to big figures. There is very active work going in the Comstock mines, and it is quite safe to affirm that such shrewd and successful men as D. O. Mills, John W. Mackay and Col. Alvizon Hayward, and others, would dispose of their milling and other interests on the lode if they did not believe that history will repeat itself again. The formation is favorable. No change in the work on the Central Tunnel level. From Con. Virginia there is nothing new; the work is confined to exploiting on the 1550-foot, 1650-foot and 1750-foot levels. Best & Belcher and Gould & Curry are repairing the Bonner shaft. No change is reported by Savage. No change in the Chollar-Potosi joint work. Active exploiting work is being done in Potosi with varying success. They are drifting south on the tunnel level.

SALT LAKE, Utah, Dec. 24, 1897.

Stocks were quite active on the floor of the mining exchange, and the dealings were distributed over quite a range of leading securities.

Ajax, during the chronicled continued advances, closed strong at 37 cents bid, while there was a noticeable demand for Bullion-Beck and Continental-Eureka. Four Aces recorded another fractional gain and was somewhat stronger in the asking. Considerable attention was paid to Geyser-Marion, which was active and a ready seller. Mammoth fell off somewhat in the bidding, while the same could be said of Mercur, and yet both of these securities were firm in the holdings. Northern Light was one of the features of the call, and made an excellent record, as well as gains over previous figures, holders being rather averse to selling at the prices quoted. Overland advanced to 35 cents in the bidding, with no sellers in the pit. Ontario made its presence felt by the transfer of 100 shares at \$4.05.

In the unlisted stocks considerable skirmishing was indulged in when Chloride Point was called, the result being that 200 shares were transferred at 46 cents. Swansea noted a sale at a decline below the figures of three weeks ago, while South Swansea was in excellent form, and registered a sale at \$1.37½.

It is understood that the Sacramento Milling company has made application to list its stock on the board, while it is stated that it will not be long before Chloride Point will find a place with the regularly boarded stocks.

VANCOUVER, Dec. 29, 1897.

The clean-up at the Golden Cache mines for the month's run, during which time there were 750 tons crushed, resulted in 900 oz. of amalgam being taken from the plates, which when retorted amounted to about \$3300 00 or \$4.40 to the ton.

This result has been extremely disappointing to a great many of the shareholders, as they expected that the result would not go less than \$10.00 to the ton. In consequence of this the stock has dropped from \$1.80 to 30 cts. per share.

At the Tin Horse mine in the Fairview Camp they were only able to run their mill for five days, as the frost got into the pipes. However for the five days they got over \$1000.00 from the plates.

The Stock Market is very quiet with little or no business doing, but as soon as the holidays are over things will no doubt begin to move.

The Rossland Camp is attracting a great deal of attention at present and will have quite a boom again in the Spring.

The Twin Silver Mining Co., whose property is in the Ainsworth, (B. C.) district, have placed considerable treasure stock in Quebec and Montreal, at 15 cents. Promoters' stock is pooled until the mine shall be on a paying basis. The company are at present driving a 200-foot tunnel.

The Slocan district in West Kootenay has during the past year shipped in large and small amounts of silver-lead, f. o. m. over fifty claims, and the production of \$2,000,000 in 1896 will be much exceeded in 1897. In 1896, 18,215 of this rich silver-bearing lead ore from the Slocan yielded net 117.4 ounces of silver per ton and 52.7 per cent lead, leaving a net profit of \$75 per ton. By customs returns so far the output for this year should show much better, as this year 35,000 tons have been shipped of this class of ore. Much active work is in progress and many new properties are being developed.

PERCY W. CHARLESON.

NEW YORK, Dec. 24, 1897.

Dealing in mining stocks has been only moderately active this week, owing in part to the approaching holidays. On the Consolidated Exchange there was a better inquiry for the Colorado stocks, especially those of Leadville, owing to good developments in the Small Hopes property. Bidders raised the price of Small Hopes from 55c. a week ago to 75c. Leadville Consolidated, which has not been dealt in since early in November, sold 550 shares at 8c.—a drop of 17c.

Lacrosse appeared this week after an absence of about three months, sales being made at 11c. Little Chief changed hands at 14c. Of the other Colorado stocks Isabella sold at 33c. to 34c. This company reports a net profit in November of \$11,472. It has been announced that Mr. J. J. Hagerman's right to vote all stock of this company known as "Stamped Isabella" ceased on December 15th, and all such stamped stock can now be exchanged for the regular stock.

Elkton was decidedly quiet in the local market, notwithstanding the fact that the company realized a net profit of \$3,873 in November, and that the closing month of the year will show a similar gain. Golden Fleece advanced from 53c. on week before last to 63½c. on December 21st. The company reports a net profit of \$4,526 in November, against \$7,489 in the previous month. Lillie was called on the Mining Exchange this week, and there were buyers of 300 shares at 72c. The company paid its second dividend of 1c. per share on December 1st, making a total of \$17,000 paid so far.

JOHN STEWART

MINING ENGINEER

Address—Mining and Metallurgical Journal
Los Angeles, CAL.
Examines and Reports on Mineral Properties

F. C. GARBUUT

MINES AND MINING

Wanted—an Asbestos Mine, 420 Stimson Block,
Los Angeles, Cal.

RANDSBURG

A. J. PETER,

MINING ENGINEER AND ASSAYER
Examiner and Dealer in Mines. Have
Several properties listed for sale. Cor-
respondence solicited with intending purchasers

FOUNDRY

Mining Machinery

Iron and Brass Castings of all kinds, Shoes and Dies, Pumps, Engines, Boilers, Stamp Mills, etc., etc. Machinists and Foundrymen.

Standard Iron Works,
PHOENIX, . . . Arizona

A. Kratzmer

Iron and Brass Castings of all kinds. Shoes and Dies, Cams, Boxes, Tappets, Mortars, etc., etc. Complete

Stamp Mills

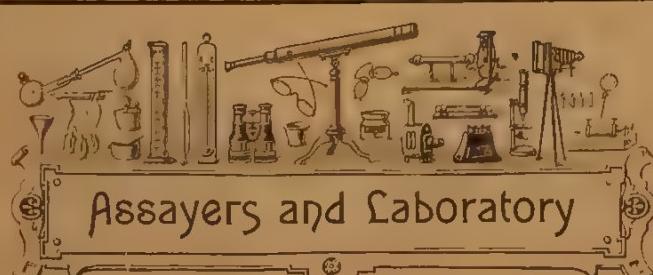
of any size made and sold at strictly

San Francisco Prices.

Correspondence solicited.

BAKERSFIELD, CALIFORNIA.

Manufactured by the Western Chemical Co., Denver, Col.
For Chlorination, Refining and other processes. Also Muriatic and Nitric Acids, Blue Vitriol, Copperas, Refined Sulphate of Soda, Etc.



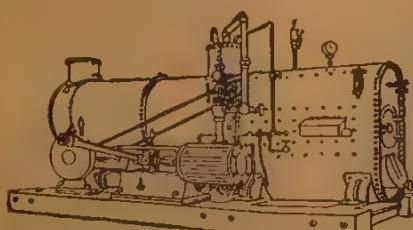
Assayers and Laboratory

Glassware and Porcelain Ware, Magnifying Glasses, Thermometers, Altitude Barometers, Compasses, and Microscopes, Wholesale and Retail.

Correspondence Solicited. Prices quoted on application.

Pacific Optical Company,

245 S. Spring St., Los Angeles, Cal.



Engines
Boilers
Saw Mills

Write for Catalogue and Prices.
RUSSELL & CO. PORTLAND, OREGON.

Sulphuric Acid

MINING STOCK QUOTATIONS

BOSTON

Acton Con.	400	Humboldt	—
Alpine	—	Hillside Steel	40 00
Anacorda	—	Lake George	17 00
Arnold	300	Lake Superior Iron	—
Atlantic	22 00	Meredith	7 75
Bonanza	—	Napa Cons.	9 50
Boston and C. Co.	—	New Idria Mg.	—
Boston & Mont. 1855	20 25	Old Dominion	25 25
Butte & Boston	20 25	Oscella	34 50
Cajonet & Hecla 1850	50 00	Pioneer	5 05
Catrina	—	Quincy	120 00
Centennial	15 50	Ridge	—
Central	—	San Ysabel	—
Dominion Cons.	21 50	Tamarack Jr.	—
Dominion Prof.	104 00	Tamarack	128 00
Franklin	—	Tecumseh	3 00
Gold Coin	2 00	Wolverine	18 00

NEW YORK.

Alamo	—	Homestead	21 50
Alice	40	Iron Silver	—
Annetta	45	Mexican	30
Beat & Belcher	80	Mollie Gibson	18
Brunswick	—	Ontario	4 50
Bulwer	—	Ophir	—
Crown Point	65	Pharmacist	10
Crown Cons. & Va.	—	Plymouth	—
Cripple Creek Con.	—	Quicksilver	3 00
Deadwood	—	Sierra Nevada	17 00
Favorite	11 25	Standard	1 50
Fortuna	—	Union Con.	—
Golden Fleece	45	Yellow Jacket	—
Gould & Curry	45	Yellow Jacket	—
Hale & Norcross	—	—	—

COLORADO SPRINGS STOCKS

Alamo	—	Isabella	30
Anaconda	45	Iowa	—
Argentum Juanita	20	Jack Pot	65 50
Banker	—	John Doe	—
Bear	—	Johnnie Gibson	22
C. K. & N.	—	Mount Rosa	—
C. C. & Mantou	32	Pharmacist	—
Creede & C.C.	—	Portland	70
C. C. Consolidated	—	Portales	—
Garfield Grouse	45	Sacramento	—
Golden Fleece	30	Star of the West	—
Gold & Globe	—	Union Gold	22
Gold Standard	—	Virginia M.	23 50
Inaley	300	Work	50
Ironclad	—	—	—

Krogh Manufacturing Company

Successor to San Francisco Tool Co.'s Machine & Mfg. Dept.
MANUFACTURERS OF AND DEALERS IN

MINING AND PUMPING MACHINERY,

Briggs' 2-Stamp Triple-Discharge Quartz Mill, of latest improved pattern. Rock Breakers, Ore Readers, Concentrators, Flotation Cells, Boilers, Holating Kilns to be operated by Horse, Steam Power or any other motor; Ore Cars and Ore Buckets, Cornish and Jack-head Pumps, Triple-acting Pumps, Centrifugal Sand and Gravel Pumps, Wooden Tanks and Pumps for the Cyanide Process, Pipe and Gate Valves, Link Chain Elevators for elevating and conveying all kinds of material. Estimates as to cost of machinery and its erection furnished upon application. Write for Catalogue and Prices.

OFFICES AND WORKS AT

51 Beale St. and 9 to 17 Stevenson St.,

San Francisco, Cal.

Lacy Manufacturing Co.

Manufacturers of

Steel Water Pipe, Well Casing, Oil Tanks and General Sheet Iron Work.
Irrigation Supplies, Steel Water Pipe for Hydraulic Purposes

4 BAKER BLOCK,

LOS ANGELES, CAL

The Southern California Lumber Co., Slimson Bldg., Los Angeles, Cal., Chas. Wier Manager, sells

LUMBER

At Wholesale Prices

Mining Timbers a specialty

Write for Prices

B. T. LLOYD
GOLD MINES,
Stocks and Bonds
BOUGHT AND SOLD

McCormick Building,

Salt Lake City, Utah

CHICAGO SCHOOL OF ASSAYING,
J. J. DUNRAVEN YOUNG, Director,
1760 MONADNOCK BLDG., CHICAGO, ILL.
Courses in Metal Chemistry, Chemical Analysis, Fire Assaying of Gold, Silver, Copper and Lead Ores, etc. Ore Testing, including Mill Processes by Mercury, Cyanide and Chlorination methods. Individual Instruction only. Open evenings. Opportunity for Miners & Prospectors

ROSSLAND, BRITISH COLUMBIA.

Brown Duke	—	Magnanita	03 1/2
Cavil	—	North Action	01 1/2
El Alamein	—	Old Dominion	—
Gold Bug	—	Pacific Con.	01 1/2
Laguna	—	Hand Mt.	02
Lucky Star	—	Wedge	02 1/2

BAN FRANCISCO.

Alpha	—	Escheguer	—
Alta Con	10	Gould & Curry	24
Andes	24	Hale & Norcross	65
Belcher	23	Justice	65
Best & Belcher	35	Mexican	33
Boile	—	Ophir	80
Challenge	10	Overman	—
Chollar	50	Potomac	46
Confidence	—	Savage	28
Con. Cal. & Va.	1	Sierra Nevada	67
Con New York	—	Union Con.	30
Crown Point	17	Utah	07
Crown Point	—	Yellow Jacket	03

BALT LAKE CITY

Alice	25	Little Pittsburg	01 1/2
Ajax	25	Lower Mam	40
Alliance	15	Lucky Bill	—
Anchor	70	Malvern	—
Bogart	—	Mammoth	2 05
Buckeye	02	Maxfield	—
Bull, Beck	35	Mercer	8 10
Cent. Burke	20	Morgan	12 1/2
Chloride Point	35	Northern Light	50
Dalton	25	Ontario	—
Daly	25	Overland	4 00
Diamond & Lee	25	Richmond Assn.	01 1/2
Dixie	140	condn	01 1/2
Eagle	02	Rover	15
East Golden Gate	—	Sacramento	20
Eureka Hill	—	Silver King	15 00
Four Aces	31	Glouce Con	—
Galena	35	Sunbeam	02
Gemini	—	Sunshine	20
Geyser-Marion	110	Swansea	1 50
Grand Central	80	No Swanson	27 1/2
Homestake	—	Utah Con	70
Horn Silver	150	Utah Con	—

HELENA, MONTANA

Am Den & M Co 100 Helena & Frisco 8 00

Bald Butte 2 60 Iron Mountain.

Bi-Metallic	—	Merill	—
Combination	—	Ontario	—
Con T & P'r'n's.	—	Yellowstone	11
Diamond Hill	—	—	—

MEXICO

Name of Company	State	Price
Allianca	Hidalgo	5
Amleto y Concordia	Hidalgo	44
Angostura	Guanajuato	710
Antonio y Anexas	Hidalgo	200
Arcadia	Zacatecas	210
Barredon y Cabras	Durango	300
Bartolome de Medina	Hidalgo	100
Caibezos y An.	Zacatecas	20
Candelaria de Pinos	"	160
Candelaria de Panuco	"	20
Candelaria de Chatich	"	80
Capuzay	Durango	120
Carmen	Hidalgo	360
Castellana y San Ram	Tepic	50
Chapala	Guanajuato	10
Chihuahua y Anexas	Guanajuato	650
Cinco Señores y An	A Luis Potosi	750
Concepcion y Anexas	"	200
El Oro	"	10
Esteban y An.	Mexico	100
Fundidora	Guanajuato	100
Huasteca	Santa Ana	100
Imperial	Michoacan	40
Iron Horse	Hidalgo	230
Iturbide	"	150
Palma	Zacatecas	150
Purisima de los Com	"	5
Real del Monte	Hidalgo	800
Refugio y Va	"	5
Rosario	Durango	50
Rosario y Anexas	Hidalgo	270
Rosario y Anexas	Hidalgo	100
Rosario y Anexas	Hidalgo	800
Rosario y Anexas	Hidalgo	400
Rosario y Anexas	Hidalgo	20
San Luis Potosi	S. Luis Potosi	730
Santa Maria de la Paz	Durango	80
Sirena	"	280
Soledad	Hidalgo	400
Sorpresas	Hidalgo	250
Trinidad	Guanajuato	40
Tlaxianguito	Puebla	27
Union	Hidalgo	260
Zaragoza	Vera Cruz	15
Zomelchucan (gold)	Vera Cruz	100
Zona Min de Pozos	Guanajuato	15

NOTE.—The above Mexican stocks are figured on the basis of Mexican silver

DENVER STOCK REPORT.

MINING PROPERTIES EXAMINED, APPRAISED AND REPORTED UPON

— AND —

Supervision taken of the development of prospects and the operation of mines.

ADOLF FRESE

ENGINEERING INSTRUMENTS

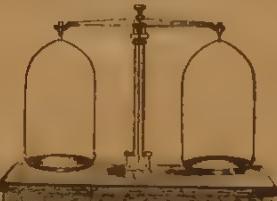
Barometers, Thermometers, Field Glasses, Microscopes and Accessories. Repairing Promptly Done.

126 S. Spring St., LOS ANGELES, CAL.

C. DUCOMMUN,

300-302 N. MAIN STREET.

LOS ANGELES

Aseyers Material
Mine and Mill Supplies

Dixon's Black Lead Crucibles, Denver Fire Clay Crucibles, Muffles, Scorifiers, etc.; Quicksilver, Drill Steel, Retorts, Mortars, Gold Pans, Drilling Hammers, Drifting Picks, Horn Spoons and Shovels.

BYRON JACKSON MACHINE WORKS

625 6th STREET

San Francisco, Calif.

Jackson's Single-Valve Cross-Compound Steam Engines.

"Light Weight" Oil Motors,

"Whirlpool" Centrifugal Pumps

"Light Weight" Horse Forks,

"Feeders" for Threshing Machines

"Eclipse" Stackers, and

"Acme" Hay Rakes.



WACKING PUMP AND STEAM ENGINE FOR 750 FOOT LIFT.

COMPOUND PUMP 200 FOOT LIFT FOR HYDRAULIC MINING

INCORPORATED MINES PAYING DIVIDENDS.

NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Mineral Produced
Aetna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Sept 1897	\$ 110,000	Q.
Adams	Colorado	150,000	1,500,000	10	04	October 1895	693,500	S, L, G.
Alaska, Treadwell	Alaska	200,000	5,000,000	25	35½	October, 1897	3,250,000	G.
Alaska Mexican	Alaska	200,000	1,000,000	5	10	Oct., 1897	297,031	G.
Alice	Montana	400,000	10,000,000	25	08	Oct 1897	1,055,000	G., S.
Anaconda	Montana	1,200,000	30,000,000	25	1 25	May 1897	3,750,000	C.
Anchoria Leland	Colorado	600,000	600,000	1	01	Oct 1897	84,000	G.
American Gold	Colorado	800,000	3,000,000	10	02	Aug 1897	273,000	G., S., L.
Atlantic	Michigan	40,000	1,000,000	25	1 00	Feb. 1897	740,000	C.
Bald Butte	Montana	250,000	250,000	1	08	Sept 1897	512,500	G., S.
Bangkok C-Bell	Colorado	600,000	600,000	1	01	July 1898	107,510	S, L, C.
Big Six	Colorado	500,000	500,000	1	00½	April 1897	5,000	G., S.
Boston & Montana	Montana	150,000	3,750,000	25	8 00	Aug 1897	6,275,000	G., G., S.
Bullion Beck and Champion	Utah	100,000	1,000,000	10	50	Mar 1897	2,465,000	G., S.
Bunker Hill and S	Idaho	300,000	3,000,000	10	05	Oct 1897	324,000	S, L.
Cariboo	British Col.	800,000	800,000	1	02	May 1897	156,955	G.
C. O. D.	Colorado	500,000	500,000	1	01	March 1896	25,000	G.
Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	Oct. 1897	50,850,000	C.
Centennial Eureka	Utah	30,000	1,500,000	50	1 00	Mar 1897	2,010,000	S, L.
Central Lead	Missouri	4,000	400,000	100	1 00	Oct 1897	18,000	L.
Charleston	South Car.	10,000	1,000,000	100	1 00	Feb 1897	150,000	.....
Champion	California	34,000	340,000	10	25	Aug 1897	278,200	G.
Consolidated, California and Virginia	Nevada	210,000	21,000,000	100	25	March 1895	3,592,300	G., S.
Copper Queen Consolidated	Arizona	200,000	2,000,000	10	25	June 1893	1,910,000	C.
Crescent	Utah	24,000	800,000	25	.....	July 1897	280,000	.....
Daly	Utah	150,000	3,000,000	20	25	Mar 1897	2,925,000	S, L.
Deadwood Terra	Dakota	200,000	5,000,000	25	40	June 1897	1,320,000	G.
De Lamar	Idaho	400,000	2,000,000	5	25	Jan 1897	2,250,100	S, L.
Della S.	Colorado	1,000,000	1,000,000	1	10	Jan 1897	60,000	G.
Doe Run	Missouri	5,000	500,000	100	50	October 1897	.....	L.
Dalton and Lark	Utah	2,500,000	2,500,000	1	00½	August 1896	87,500	S, L.
Elkton Consolidated	Colorado	1,250,000	1,250,000	1	03	Sept 1897	361,960	G., S.
El Paso	Colorado	850,000	850,000	1	01	Aug 1897	5,393	G., S.
Florence	Montana	500,000	2,500,000	5	01	May 1897	132,530	S.
Gaiena	Utah	100,000	1,000,000	10	05	Jan. 1897	71,000	G., S., L.
Garfield Grouse	Colorado	1,200,000	1,200,000	1	01	Feb. 1897	24,000	G.
Geyser-Marion	Utah	300,000	1,500,000	5	08	Nov 1897	54,000	G.
Golden Eagle	Colorado	1,000,000	1,000,000	1	01	Sep. 1896	10,000	G.
Golden Fleece	Colorado	600,000	800,000	1	01	Feb. 1897	569,178	G., S.
Gold Coin	Colorado	200,000	1,000,000	5	05	Ang 1897	150,000	G., S.
Gold and Globe	Colorado	750,000	750,000	1	3-10	July 1897	51,325	G.
Hecla Consolidated	Montana	30,000	1,500,000	50	50	Feb 1897	2,175,000	S, G., I., O.
Helena & Frisco	Idaho	500,000	2,500,000	5	04	August 1896	475,000	S, L.
Highland	S. Dakota	100,000	10,000,000	100	20	Oct 1897	3,424,918	G.
Holy Terror	S. Dakota	300,000	300,000	1	03	Sept 1897	18,000	G.
Homestake	Dakota	125,000	12,500,000	100	25	Oct 1897	6,481,250	G.
Hope	Montana	100,000	1,000,000	10	10	Nov 1897	782,252	S.
Horn Silver	Utah	400,000	10,000,000	25	12½	January 1896	5,080,000	S, L.
Idaho	Brit. Col.	500,000	500,000	1	05	Mar 1887	152,000	.....
Iowa	Colorado	1,000,000	1,000,000	1	00½	Oct 1897	65,000	G.
Iron Mountain	Montana	500,000	5,000,000	10	01	Sept 1897	497,500	S.
Isabella	Colorado	2,250,000	225,000	100	00½	June 1897	270,000	G.
Kearsarge	Michigan	40,000	1,000,000	25	10	Aug 1897	160,000	C.
Last Chance	Brit. Col.	500,000	500,000	1	04	Jan 1897	42,000	S, L.
Le Roi	British Col.	500,000	2,500,000	5	10	Oct 1897	825,000	G.
Minnesota	Minnesota	165,000	16,500,000	100	1 50	July 1896	3,210,000	I.
Montana Ore Purchasing	Montana	40,000	1,000,000	25	01	October 1897	640,000	.....
Moose	Colorado	600,000	600,000	1	01	January 1896	186,000	G.
Morning Star	California	2,400	240,000	100	8 00	Sept. 1897	558,800	G.
Mt. Rosa	Colorado	1,000,000	1,000,000	1	00½	Oct. 1896	30,000	G.
Mercer	Utah	200,000	5,000,000	25	12½	Oct 1897	825,000	G.
Mammoth	Utah	400,000	10,000,000	25	05	Nov. 1896	1,150,000	G., S., O.
Moon Anchor Gold	Colorado	800,000	800,000	1	02½	Nov 1897	63,000	G.
New Elkhorn	Colorado	300,000	1,500,000	5	24	Sep. 1896	72,000	G.
New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	Oct 1897	832,500	S, G.
Napa	California	100,000	700,000	7	20	Oct 1897	870,000	Q.
New Idria Quicksilver	California	100,000	500,000	5	10	Sept 1897	20,000	Q.
Ontario	Utah	150,000	15,000,000	100	10	June 1897	13,445,000	S, L.
Osceola	Michigan	50,000	1,250,000	25	1 00	June 1897	2,172,500	C.
Parrot	Montana	230,000	2,300,000	10	06	June 1897	1,656,122	C.
Pennsylvania Consolidated	California	61,500	5,150,000	10	05	Sept 1897	20,750	.....
Portland	Colorado	8,000,000	3,000,000	1	01	Oct 1897	1,163,000	G., S.
Princess	Colorado	1,000,000	1,000,000	1	00½	Feb 1897	45,000	G.
Quincy	Idaho	100,000	2,500,000	25	4 00	August 1897	9,470,000	G.
Rambler-Cariboo	Brit. Col.	1,000,000	1,000,000	1	02	April 1897	40,000	.....
Reco	Brit. Col.	1,000,000	1,000,000	1	50	May 1897	187,500	S, L.
Sacramento	Utah	1,000,000	5,000,000	5	00½	March 1897	22,000	G.
Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	Mar 1890	3,275,000	S.
South Swansea	Utah	150,000	150,000	1	05	Oct 1897	59,960	S, L.
Standard	California	200,000	20,000,000	100	10	Sept 1897	3,757,588	G., S.
St. Joseph	Missouri	250,000	2,500,000	10	15	Oct 1897	24,000	L.
Silver King	Utah	150,000	3,000,000	20	25	October 1897	1,237,500	S, L, G.
Slocan Star	Brit. Col.	2,000,000	1,000,000	0.50	05	Mar 1897	350,000	.....
Smuggler Union	Colorado	50,000	5,000,000	100	1 00	Oct 1896	160,000	G., S.
Swansea	Utah	100,000	500,000	6	05	Oct 1897	61,500	S, L.
Tom Boy	Colorado	200,000	2,000,000	10	20	March 1896	410,000	G.
Tamarack	Michigan	60,000	1,500,000	15	3 00	June 1897	4,950,000	C.
Union	Colorado	1,250,000	1,250,000	1	01	June 1896	73,000	S.
United Verde	Arizona	300,000	3,000,000	10	25	December 1893	562,500	C.
Utah	Utah	100,000	1,000,000	20	02	Feb. 1897	175,000	G., S.
Utah Consolidated	Utah	30,000	150,000	5	02	Sept. 1898	3,000	S, L.
Victor	Colorado	200,000	1,000,000	5	10	March 1897	785,000	G.
Western Mine Enterprise	Montana	500,000	500,000	1	10	Mar 1897	12,000	.....
War Eagle	British Col.	500,000	500,000	1	06	October 1896	187,000	.....

S, Silver.

G, Gold.

L, Lead.

C, Copper.

Q, Quicksilver.

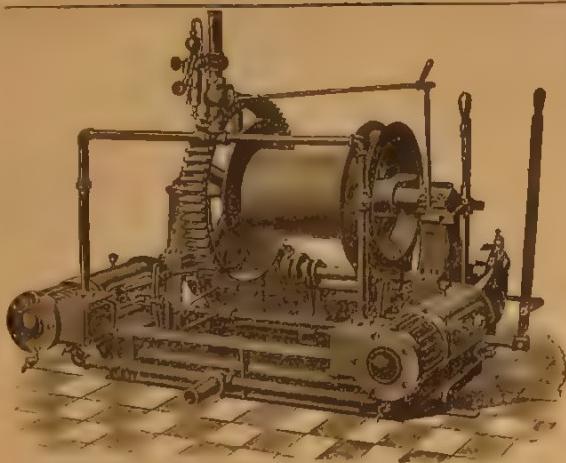
I, Iron.

B, Borax.

BAKER & HAMILTON,

HIGH GRADE

Engines, Boilers, Ice Machines, Mining Tools, Etc., Etc.



THIS CUT represents one of our improved DOUBLE STEAM HOISTING ENGINES. We have them in sizes from 12 H. P. up (with or without boiler). They are constructed with the greatest care by engineers familiar with the best previous practice. They come with sectional iron frames, reversible link motions, etc.; consequently can be shipped knocked down, in pieces suitable for transportation over difficult roads and trails.

We also have them with the Single Engines from 6 H. P. up; Boiler and Engine contained on same frame.

Write for Prices; They Will Interest You.

SAN FRANCISCO, CAL.

BRANCH HOUSES:
Sacramento and Los Angeles.

FACTORY:
Benicia, California



Pacific Tool & Supply Co.

120 FIRST ST., SAN FRANCISCO, CAL.
SOLE AGENTS FOR PACIFIC COAST

14 in. x 6 ft. Hendey-Norton Lathe with Improved Automatic Stop.

This lathe combines the latest and best improvements. Automatic stop. It is simple, durable, indispensable. It will automatically stop the carriage in either direction. It is equally efficient whether feeding or thread-cutting, running up to a shoulder, boring to bottom of holes, or internal thread-cutting. No danger of spoiling either tool or work. It is a safeguard against accidents in either direction.

Feeds.—It has all feeds in daily use with simple movements of lever.

Threads.—It has all threads in daily use with simple movement of lever.

Carriage.—The carriage reverses in apron. No slamming or countershaft.

There is no comparison between this lathe and the old style or common lathe. Quick work, rapid changes, satisfactory results.

BUY THE BEST.

SEND FOR CIRCULAR

PUMPING MACHINERY

FOR EVERY POSSIBLE DUTY.

DOW STEAM PUMP WORKS,

SAN FRANCISCO, CAL.

HENRY RIVES ELLIS

Mining Engineer and Metallurgist

Ore Sampled, Assayed and Analyzed. Practical working tests by Stamp, Pan and all Processes.

Assay Office and Metallurgical Works,
318 PINE STREET, SAN FRANCISCO, CAL.

KLONDIKE OUTFITS
I am prepared to contract for the complete outfitting of Parties going into the Klondike from Vancouver, B.C., the best place from which to outfit and sail.

Direct Steamers. No duty to pay on goods.
Write or wire for full particulars.

PERCY W. CHARLESON, General Broker
VANCOUVER, B. C. P. O. Box, 189
CABLE ADDRESS, "CHALCOUVER"

A. F. JUDSON, E. M.

Geologist and Mining Engineer,

Mines Examined and Reported on.
COLTON, CALIFORNIA

A. A. WARREN

ASSAYER AND
ANALYTICAL CHEMIST

COLTON, CALIFORNIA

F. A. A. WILLIAMS,
Mines & Mining

A free Milling Gold Property at a bargain
Correspondence Solicited

— TRINIDAD, COLORADO —

ASSAYERS AND CHEMISTS

Working tests of Ores by all processes.
Samples by mail or express solicited

TREMAINE & FROELICH,
132 Third St., PORTLAND, OREGON

ROGERS & BALDWIN,

MACHINE SHOP

All kinds of repairing
for Engines, Boilers and Machinery

Riverside, Cal.

GOLD

— AT —

Virginia Dale

Reached in the Shortest and
most expeditious way via

The Santa Fe Route

— AND —

* * * AMBOY * * *

Only Six Hours stage ride. Stage leaves Amboy for DALY CITY every Wednesday on arrival of Santa Fe through trains, 150 pounds carried free on railroad; 60 pounds free on stage. Through tickets and particulars of any Santa Fe Route Agent.

OTTO HECKELMANN

FERDINAND McCANN

ASSAYERS AND CHEMISTS.

Heckelmann & McCann + + Bullion Dealers

Cash paid for all kinds of Gold, Silver and Ores. All assays and Chemical Analysis at Mexican Silver Rates, 50 per cent. Less than American Price.

PUNTE DE SAN FRANCISCO, NO. 6

CITY OF MEXICO

ANTIMONY.

We buy Antimony Ore in any quantity and pay prompt CASH for same. Write us and let us know what you have.

Chapman Smelting Works Co.,
(INCORPORATED)

499 Battery Street, San Francisco, Cal.

SAN FRANCISCO OFFICE

644 MARKET ST.

LOS ANGELES OFFICE

200 S. SPRING ST.

Ores! Ores! Ores!!

Gold, Silver and Lead Ores and Concentrates

Purchased at Reduced Rates for Treatment.

Selby Smelting and Lead Co.

416 MONTGOMERY ST., San Francisco

Consign Shipments to Vallejo Junction, Cal.

GEO. M. COOLEY,

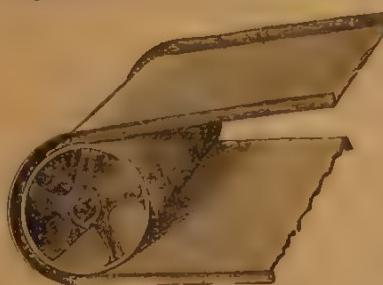
Sheet Hardware, Iron, Steel, Powder, Caps, Fuse, Packing, Belting, Asbestos Covering, Shovels, Picks, Iron Pipe, Steam Fitting.

Agent Weber Gasoline Engine.

SAN BERNARDINO, CAL.

Spadone's Concentrator Belts

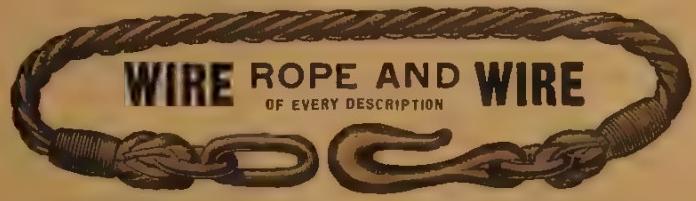
Patented



This illustration shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inner face surfaces of the edges. Therefore all belts have been so constructed that when they pass over the pulley or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. We avoid this Mechanical Defect by our Spadone Curved Edge. Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

Send us your order for Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING, RUBBER PACKING and LEATHER BELTING.

The Gutta Percha Rubber and Manufacturing Company,
30 and 32 FREMONT STREET, SAN FRANCISCO, CAL.

WASHBURN & MOEN MFG. CO.

PACIFIC WORKS

SAN FRANCISCO

THE COLORADO IRON WORKS COMPANY, DENVER, COLORADO.

ENGINEERS AND MANUFACTURERS

Ore Milling and Smelting EQUIPMENTS

For all Processes

COMPLETE PLANTS DESIGNED and ERECTED

We make Smelting Furnaces, Ore Dryers and Roasters, Stamp Mills, Ore Breakers, Crushing Rolls, Roller Quartz Mills, Ore Feeders, Perfection Concentrators, Vanning Machines, Slime Tables, Hydraulic Classifiers, Forged Steel Shoes and Dies, Elevators, Mine Cages, Ore Cars and Buckets, Amalgamating Pans and Settlers, Cyanide Tanks, Chlorination Barrels, etc., etc., etc.

CATALOGUES ON APPLICATION

We Manufacture

**STAMP MILLS,
CRUSHERS,
CONCENTRATORS,
ENGINES,
PUMPS, HOISTS,**



Stockton Gas Engine, Water Wheels, Wood, Iron, and Clutch Pulleys, and general repairing of all kinds of Wood and Iron. All work done in our own Shop. Estimates furnished for Plants Complete.

Best Equipped Works in California, outside of San Francisco

CORRESPONDENCE SOLICITED

**Matteson
Manufacturing Co.**

Stockton, California

WHITNEY COMPANY**Iron and Steel. Miners, Blacksmiths, Machinists Supplies**

Agents for Arizona and New Mexico for Marsh Steam Pump, Agents Hercules High Explosives. Miner's Supplies by car load. Fairbanks-Morse Hunting Machinery and Engines. Full line of Steam Fittings and ENGINEERS Supplies. A specialty made of Supplying the Mining Trade of the SOUTH-WEST

ALBUQUERQUE * * NEW MEXICO

BOILERS AND ENGINES

Union Iron Works, Erie, Pa., Tubulars and Worthington Safety Water Tube Boilers. Erie Engine Works Slide Valve and Automatic Engines. Correspondence solicited.

Caldwell Bros.

Tacoma and Seattle, Washington



**The Finlayson Patent
WIRE ROPE
TRAMWAY**

The Newest and Best Aerial Tramway built. Automatic, Economic in operation, Capacity Unsurpassed Special Pamphlet on application.

A. A. BAILEY

MANUFACTURER AND DEALER OF THE LEADING

Packings and Engineers Supplies

LUBRICATING OILS AND COMPOUNDS

Exclusive Manufacturer of the UNSURPASSED

BAILEY

Anti-Friction Metal and all other Grades of Babbitt Metal

Sole Agents for Reliable Steam Pumps

300 South Los Angeles Street, LOS ANGELES, CAL.

P. & B. PAINTFOR MINES, SMELTERS, CHLORINATION WORKS,
THE CYANIDE PROCESS.

WILL BE PLEASED TO MAIL CIRCULARS

PARAFFINE PAINT COMPANY, Los Angeles and San Francisco

Second-Hand MachineryPumps, Engines, Boilers, Shafting,
Pulleys, Water Pipes, Belting, Etc.

Repairing Promptly Attended to at Lowest Rates.

McIntosh & Wolfman,
137 and 139 Beale Street, San Francisco, Cal.**"READY ROCK" ASPHALT ROOFING**THE STANDARD ROOFING OF THE
UNITED STATES

Absolutely the most durable, convenient and strongest roofing material made.

"Ready Rock" Asphalt Roofing Co.

1006 North Main Street,

TELEPHONE MAIN 1870

Los Angeles, Cal.

THE JOHANNESBURG SAMPLING WORKS

Purchasers of Gold, Silver, Copper and Lead Ores and Concentrates

Cash Returns Made Within Twenty-four hours after receipt of Ore.

CHAS. R. WORES, MANAGER,

Johannesburg, Cal.

Why SEND YOUR MONEY EAST FOR

Shoes and Dies, Camp Tappets, Car Wheels, Shafting, Hangers, Pulleys, Ore Cars and Iron and Brass Castings, when they can be obtained for the same price and in less than half the time

AT THE

Albuquerque Foundry and Machine Works,

Repairing of Mill and Mining Machinery a Specialty, Albuquerque, New Mexico

**Los Angeles
Business College**

212 WEST THIRD ST., LOS ANGELES, CAL.

Gives a thorough course in PRACTICAL ASSAYING and CHEMICAL ANALYSIS in connection with their other courses of study. For full information address them as given above.

N. D. BURLINGHAM, M. E.

Practical Examinations of Mines anywhere. Plans and estimates for Mining Machinery on short notice.

FORTY YEARS EXPERIENCE IN MINING AND MILLING

HENNE BLOCK, LOS ANGELES

WANTED GRUBSTAKES for a few experienced prospectors to go in our party. Special opportunity in new field.**Church & Teter,**
Mining Engineers

San Francisco, Cal., and Juneau, Alaska

**Harper & Reynolds Co.,
MINING + SUPPLIES ***

AGENTS FOR

Giant Powder Co., Galvanized Spiral Pipe,
Steel and Iron.152-154 North Main Street, LOS ANGELES, CAL.
151-152 North Los Angeles Street,**BLOWERS AND FORGES**

For Sale by

This Forge
Heats 100 lbs
Weight 22 lbs

PENZ

\$6.50

Manufactured
expressly
for Prospector.

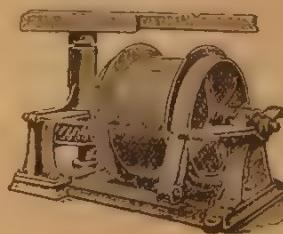
JOHNSON & MUSSER,

MANUFACTURERS,
113 N. Main St., Los Angeles, Cal.**J. B. HAWLEY & CO.**Analytical Chemists and
AssayersAccurate Analysis of Ores, Water, Soils,
Etc. Samples by mail receive
Prompt Attention.

232 New High Street, 175 N. Spring Street, Los Angeles, Cal.

**The Mining and
Metallurgical Journal**

OFFICES:

Sumson Block, Los Angeles, Cal.,
64-65 Merchants' Exchange, San Francisco**EL PASO AUTOMATIC HORSE WHIM**

This is the latest improved horse power hoist offered prospectors, possessing all the best features of other styles with improvements added. The end thrust is entirely done away with, thus increasing the efficiency and saving considerable wear. The automatic safety break is so arranged that accident is impossible, being in position until held out by operator to lower bucket. It is made entirely of iron and steel. Weight, about 1,200 pounds. Heaviest single piece, 275 pounds.

Price, ea. \$100 in Colorado Springs, \$100.00
Cars, Buckets, Rope, Rails, etc.; The Climax
Engines; Hand Power Machine Drills.
Manufactured by The Hassell Iron Works Co.,
COLORADO SPRINGS, COLO., U. S. A.**Pioneer Assay Office**LEW. E. AUBURY,
115 West First St., Los Angeles, Cal.

(OPPOSITE NATICK HOUSE)

BRANCH OFFICE: SAN DIEGO, CAL.

Highest Prices for**GOLD DUST, BULLION
and Furnace Products**Mines Examined, Ores Treated by
any Process**J. B. Pope**D. S. Mineral Surveyor,
San Bernardino, Cal.

A. H. WARD

C. A. LUCKHARDT & CO.

Nevada Metallurgical Works, Established 1869

71 AND 73 STEVENSON STREET, SAN FRANCISCO, CAL.

Assaying, Analyses, Sampling.

Practical Working Tests of Ore by all Processes

STAMP MILL AND CONCENTRATOR IN OPERATION ON THIS PREMISES

W. W. MONTAGUE & CO.

MANUFACTURERS OF

Riveted Sheet Iron and Steel

WATER PIPE

For Hydraulic Mining Power Plants and Mills.

Iron Cut, Punched and Formed for Making Pipe on the Ground Where Required to Save Freight.

GALVANIZED IRON*Air Pipe, Concentrator Rolls, Water Tanks*

SAN FRANCISCO, CAL.

**THE BI-METALLIC ASSAY OFFICE
AND CHEMICAL LABORATORY.**

Assaying in all its branches. Determinations accurately made.

R. A. PEREZ, E. M., Mgr.

FORMERLY: Chief Assayer El Paso Smelting Works, El Paso, Tex.
Assistant Chemist Consolidated Rennan City Smelting and Refining Co., Argentino, Rennan.

(Prompt Returns.)

124 S. MAIN ST., LOS ANGELES, CAL.

UNION HARDWARE AND METAL CO.

DEALERS IN —

Boiler Tubes, Iron Pipe and Fittings

RAILROAD, MILLING, MINING and FOUNDRY SUPPLIES

214 and 216 N. Los Angeles Street

Los Angeles, Cal.

M. C. BULLOCK M'F'G CO.

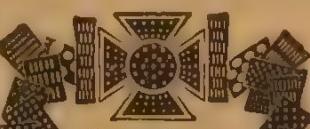
Diamond + Drills

For prospecting and mining purposes. In use in the leading mines, easily worked, little repairing. For full particulars address

Caldwell Bros.



Tacoma and Seattle, Washington

**Quartz Screens**

A specialty. Round, slot or burred slot holes. Genuine Russian Iron, Hot-rolled Steel, Cast Steel or American planished Iron, Zinc, Copper or Brass Screens for all purposes. CALIFORNIA PERFORATING SCREEN CO., 145-147 Beale St., S. F.

B. B. BURLINGAME'S

ASSAY OFFICE Chemical Laboratory

Established in Colorado, 1868. Samples by mail or express will receive prompt and careful attention. Gold and Silver Bullion refined, melted and assayed, or purchased.

Address 1730 and 1738 Lawrence St., Denver, Col.

H. L. NELSON & CO.

Real Estate and Mining Broker

Abstract Bureau & Notary Public. Correspondence Solicited. RANDSBURG AND JOHANNESBURG, CALIF.

**TANKS**

OF EVERY DESCRIPTION

— FOR —

Mines, Mills and Cyanide Plants
Patent Non-Shrinking Water TanksThe only Tank that will stand the Desert
and Hot ClimateWrite for Catalogue and Estimate on any kind
of Tank Work

Pacific Tank Co.

33 BEALE ST., SAN FRANCISCO

To Gold Miners!**Silver Plated Copper AMALGAMATING PLATES**

For Saving Gold In Quartz and Placer Mining.

EVERY DESCRIPTION OF MINING PLATES MADE

Only Best Copper and Refined Silver Used. Old Mining Plates Replated. Twenty-six Medals Awarded. Gold, Silver, Nickel, Copper & Brass Plating.

Denniston's San Francisco Plating Works

553 and 555 Mission Street, San Francisco, Cal.

Telephone, Main 5931.

E. G. DENNISTON,

Proprietor

Send for Circular.

TRUE ORE CONCENTRATOR

Over 4,000 in Actual Use

Manufactured under Patents of April 27, 1880; Sept. 15, 1883; July 24, 1888, and March 31, 1891



It can be safely stated, without going into a description of several new and untried concentrators that have lately come into the market, that where sulphurates are of such value as to make close saving necessary, the True Vanner is always used. It is the only endless belt concentrator in the market that can be relied on to handle such material and give universal satisfaction. (In all competition of concentrators the True Vanner is taken as the standard machine of the world, and all competitors made by it.) There have been over 4000 of these machines sold, 1700 having been sold on the Pacific Coast alone. They are in use in every part of the world where mining is carried on, and in all cases they are giving perfect satisfaction. From time to time valuable and important improvements have been made in this machine to increase its capacity and durability, and particular attention is called to the Vanner Type Belt, which does away with nearly all the strain of the belt in the frame. This is done by making the 16 ft. of belt more than double that of other style belts in the market. There is no danger of the belt breaking over the edge of the frame, thereby distributing the strain in the side roller, and changing the point of strain either at the edge or at the base of the frame, as is the case in all belts with a straight edge.

Price of 4-foot wide Plain Belt True Vanner	\$100 f. o. b.
" Improved Belt True Vanner	\$100 f. o. b.
" 6-foot wide Plain Belt	\$100 f. o. b.

For any information, pamphlets, circulars or testimonials, call on or address
JAS. S. BROWNELL, Western Agent TRUE VANNING MACHINE CO.
Successor to ADAMS & CARTER
1110 Market Street, San Francisco

THE WILSON
Forged High Grade Steel
Shoes and Dies

Guaranteed to Wear Longer and Prove Cheaper than any others.

Made by use of Special Appliances. Patented Aug. 16th, 1895.

— Made only by —

WESTERN FORGE AND ROLLING MILLS

St. Louis, Missouri

JOSHUA HENDY MACHINE WORKS

MOLD AGENTS

38 to 44 Fremont Street,

San Francisco, Cal.

FOR SALE!

One 50-ton Silver-Lead Water Jacket Furnace, Boiler, Engine Blower, Rock Breaker, Scales, Shafting, Pulleys, Belting, Tools and all fittings and fixtures complete and new, built by Penzer & Chalmers; also one 16x42 Hamilton Corliss Engine; one 12x20 double Cylinder Hoisting Engine. Will be delivered f. o. b.

W. E. DAME, CERRILLOS, NEW MEXICO

Chemist to the Board of Health of the City of Spokane. All Assays guaranteed to check with U. S. Mint.

E. B. VAN OSDEL, A. M.

Assayer and Analytical Chemist

Anything Analyzed.
109 Howard Street, Spokane, Washington

PATENTS!

TOWNSEND BROTHERS

SOLICITORS OF PATENTS

Patents on Inventions secured in all countries. Copyrights, Trade Marks and Labels.

Office, 9, Dowley Block, Los Angeles, Cal.

Telephone 347.

ASSAYERS AND CHEMISTS**WADE & WADE**

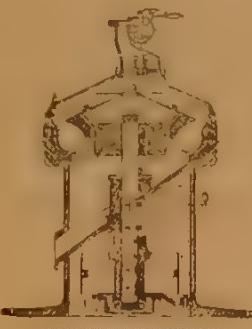
Best and Oldest Establishment in Southern Cal.

115½ N. Main St., Los Angeles, Cal.

AUSTIN BROS.**IRON, STEEL, MACHINISTS AND BLACKSMITH SUPPLIES**

Iron Pipe, Oil Cups, Lubricators, Belting, Packing, Lacing, Asbestos Covering, Steam and Water Gauges, Shoes and Picks. Fairbanks Scales, Brass and Iron Steam Fittings, Etc., Etc.

Stockton, Cal.

MORRIS BALL PULVERIZER

MORRIS BALL PULVERIZER



IT POSSESSES GREATER CAPACITY THAN ANY MACHINE OF EQUAL WEIGHT. IT PULVERIZES HARD OR SOFT ORE EQUALLY WELL. IT MAKES NO DUST IN DRY PULVERIZING. IT REDUCES EITHER WET OR DRY EQUALLY WELL AND PULVERIZES TO ANY DEGREE OF FINENESS.



For further information Catalogues and Testimonials apply to

D. M. DOUB, General Agt., 137 First St. San Francisco.

E. C. CREEL, Presidente.

JUAN A. CREEL, Gerente

COMPANIA INDUSTRIAL MEXICANA

Ferreria
Fundicion de Fierro y Bronce

Fabricantes...

de toda clase de

Maquinaria para minas y
Haciendas de Beneficio

Quebradoras Maquinas de vapor.
Retortas, Ruedas Hidraulicas, Calderas de todas clases, Maquinas de extraction. Carros para mineral, Molinos Huntington. Bombas, Malacates de Vapor, panes de amalgamacion. Concentradoras, compresores de aire. Lavaderos, Haciendas de Lixiviation; Hornos de chaqueta ("Water Jackets.")



~~~~~  
Dinamos, Motores y Material Electrico.

**BARATARIA y PRONTITUD.**

Se envian circulares Pedido. Para informes dirigirse al gerente,

Se solicita la correspondencia.

JUAN A. CREEL.

**Chihuahua,**

**Mexico**



## W. T. GARRATT & CO. Brass Machine Works.

### MANUFACTURERS

HOOKE STEAM PUMPS,  
MINERS' SINKING PUMPS,  
TRIPLE PLUNGER PUMPS,  
JACKHEAD MINING PUMPS,  
CENTRIFUGAL PUMPS,  
GONGS FOR MINE SIGNALS,  
LUBRICATORS & OILERS,  
SUCTION HOSE AND COUPLINGS,  
HYDRAULIC PIPES,  
IRON PIPE AND FITTINGS  
BABBITT METALS,  
PACKINGS  
REPAIRING PROMPTLY ATTENDED TO.

138 to 148 Fremont Street,  
SAN FRANCISCO, CAL.



## MINERS' OUTFITS.

IRON MORTARS,  
AMALGAM MORTARS,  
GOLD WASH PANS,  
MINERS HORNS,  
BUTTAS, CRUCIBLES,  
HORSE-SHOE MAGNETS  
MAGNIFYING GLASSES  
IRON RETORTS,  
CHEMICALS, SCALES,  
WEIGHTS, ETC.



Including a full assortment of Mine and Mill Supplies, Assayers' Materials, Etc.

Sole Agents for the Pacific Coast for the

W. S. TYLER WIRE WORKS CO.

Manufacturers of

Steel and Brass Wire Battery Screens  
Agents for Baker & Adamson's Chemically Pure Acids. A full Stock always on hand.

Nitric Acid, sp. gr. 1.42; Muriatic Acid, sp. gr. 1.20; Sulphuric Acid, sp. gr. 1.85.

JOHN TAYLOR & CO.  
63 FIRST ST., SAN FRANCISCO  
Prices on application.

## The State Ore Sampling Co.

DENVER, COLORADO.

Gold, Silver, Lead and Copper Ores and Matte sampled and marketed to the best advantage. With modern mills and machinery our facilities for sampling ores are the best.

Our long experience in the market enables us to obtain the highest prices for all marketable ore. Write for our "Reference Book." Send analysis of your ore for prices and information.

BAILY & MONNIG, Managers.

## Ship Your Ore

— TO THE —

## Silver City Reduction Co.

SILVER CITY, N. M.

CORRESPONDENCE SOLICITED

RIVETED SHEET STEEL WATER PIPE  
For Placers, Water Powers, Irrigation, Etc.  
THE WEIGLE PIPE WORKS  
2949-51 Laramie St.  
DENVER, COLO.

J. Q. A. KING, Assayer and Cyanide Operator

Sole Agent for Arizona Kendall Gold and Silver Extraction Co.

An Improved Cyanide Process.

Mines, Smelting, Milling, Smelting and Cyanide Machinery, Cyanide, Zinc Shavings, Sheets and Discs; Mercury and Assayers' Supplies; Manufacturers' agent for everything from mine to mint. Scientific books and papers. Smelting ores and concentrates wanted, also tailings. Prompt quotations and shipments.

PHOENIX, ARIZONA.

## WHITE, ROGERS & CO'Y.

CONSTRUCTING ENGINEERS AND MILLWRIGHTS

300 PINE STREET, SAN FRANCISCO, CAL.

WILFLEY CONCENTRATOR,

One of these Machines will take the place of TWO or THREE Belt Concentrators of any make and do very much better work.



WILFLEY CONCENTRATOR



## THE Denver Fire Clay Co.

Assayers' and Chemists' Supplies

MANUFACTURERS OF

Crucibles, Scorifiers & Muffles

And all other kinds of

Fire Clay Material.

SPECIALTIES—Strictly c. p. Acids

Teat Lead, Bone Ash, Cyanide

Potash, Argol, Borax, Borax Glass

Iron Sulphides, Litharge, Soda

Mining Fluxes, etc.

Sole Agents for the

Ainsworth Balances

OFFICE

3101-3141 Blake St., 1742-1746 Champa St., Denver, Col.

**\$33,189,500**

Paid in Dividends by Utah Mining Stocks

Weekly Market Letter on Application.  
Quotations by Wire or Mail.

JAMES A. POLLOCE, Mining Stock Broker,  
SALT LAKE CITY, UTAH.

S. L. BURBRIDGE,

CONSULTING

DINING AND METALLURGICAL ENGINEER  
405-406 BAILEY BLOCK,  
Mines examined and reported on.

SEATTLE, WASHINGTON

FAUTH & COMPANY,

(O. N. BARGMULLER),

Engineering and Mining Instruments,

WASHINGTON, D. C.

Attention is called to our newly improved  
Mining Transit with best Solar Attachment  
and Vertical Sighting Telescope and Quick  
Leveling Head.

## ASSAYER and CHEMIST

Mark samples plainly and clearly by letter  
of full details, with charges enclosed.  
Postage on ore one cent per ounce.

C. H. VOLL,

34 Roxwell Bldg., SEATTLE, WASHINGTON

## CLARENCE HERSEY, Assayer and Chemist,

(Established 1879,

LEADVILLE, COLORADO

## Samples by Mail or Express Re- ceive Prompt Attention

### SPECIMEN ASSAY PRICES:

Gold silver and lead, \$1.00; any two of the  
above, 75¢; any one of above, 50¢; copper analy-  
sis, \$1; platinum, nickel or tin, \$5.00.  
Write for full price list and mailing envelopes.



105 Beale Street San Francisco, California.

Sole Pacific Cond. Agents and Builders of the Celebrated

Price #450 f. o. b. San Francisco

## SEND FOR CIRCULARS

Some Practical Reasons Why the Wilfley Concentrator Should be used in Gold Mills:

1. It will successfully handle three or four times more material than any belt concentrator made, barring none.
2. It will save more sulphurates in proportion while so doing, and catch any float gold, amalgam or quicksilver which may escape from mortars or plates.
3. It will make cleaner and more valuable concentrates, thus saving useless expense for transporting valueless material, as also extra cost for treatment.
4. It requires little or no attention when once adjusted and no expert is required to either adjust or run the machine.
5. It will have much expense in power and room, and the first cost of a mill requiring concentrators.
6. It has no expensive belts to stretch and wear out, nor complicated machinery to keep in repair.
7. It is the only sensible plan of concentration, as any kind of material can be worked, which is not true of any style of belt machine.

# Silver Plated Amalgam Plates

FLINT &amp; LOMAX, DENVER, COLO.

N. OHLANDT &amp; CO.

MANUFACTURERS OF

## Best Quality of BONE ASH for Assayers.

Our Goods are used in all parts of the United States and Mexico.

EXTRA No. 1 and No. 2

CORRESPONDENCE SOLICITED

327 MARKET STREET, SAN FRANCISCO, CAL.

**J. C. WINANS**, Sole Agent Peerless Rubber Manufacturing Co.  
 Winans' Anti-Leakage  
 Tension Powder, Gland Ring  
 Packing, Precision Bell  
 Packing, Teflon, Felt, Gaskets, Lubricating Compound, Rubber Pump Valves, Vulcanized Fiber Pump Valve, Mica Gaskets, Anti-Leakage Metal, Fox Packing, Spiral Packing, Gaskets, Lead-Free Lead Sheet, Sheet Rubber of all kinds, Water Glass, W.A.C. Water Glass Cutters, Dealer and Supply all Packings on the Market. Special Heavy Duty Pump Packing, Winans' Pressure Regulator, absolutely reliable. Promoted by Experts  
 the Best Manufactured  
 220 FREMONT STREET, SAN FRANCISCO, CAL.

## ANTI-CALORIC STEAM PIPE AND BOILER COVERING

In canvas, F.4CKETTED SECTIONs and Plastic  
 Material Manufactured in San Francisco under  
 Patents controlled exclusively by the Co.

**Certificate of Superiority**  
**Over All** other Coverings awarded by  
 Mechanics Institute Exhibition 1896

507 MARKET STREET, SAN FRANCISCO, CAL.

**KLONDYKE** Our Mining Dredge is  
 Just the Thing for it  
 PLACER MINING  
 A SPECIALTY.



Dredging & Mining Machinery Co.,  
 Kansas City, Mo.

## Stockton Assay Office

Gold and Silver Assays \$1.00  
 Fine Assays and over, \$1.00 each

329 E. Magnolia street, Stockton, Cal.  
 Send Samples and remittances  
 by Express or mail

**C. W. KEMPTON**  
 MINING ENGINEER

Oro Blanco, Arizona

20 years experience in exploration, mining and  
 milling - 10 years as superintendent and manager,  
 Boston, New York, and Chicago references

**Shephard, Wheeler & Rhodes**  
 Mining Engineers and U. S. Deputy  
 Mineral Surveyors.

Have a Complete and Accurate Map made from  
 Actual Surveys, showing all Mining Claims  
 in the Randsburg Mining District.

Price, \$10.00 Randsburg, Cal.

**DR. W. F. DRAKE, E.M.**

Mines and Mining

Reports and Examines Mines. Years of practical  
 experience. Correspondence solicited.

P. O. Box 899

SONORA, Tuolumne County, Cal.

## Chicago and Aurora Smelting and Refining Co.

Lead, Silver and Gold Ores

Works at Leadville, Colo., Aurora, Ill., and Chicago, Ill.

General Office, Woman's Temple,

Manufacturers of BLUE VITRIOL

Chicago, Illinois

## MILLWRIGHT AND ENGINEER

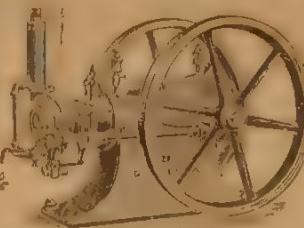
Contractor for the Erection of All Kinds of  
 Mining and Milling Plants.

**E. L. HALLAWELL,**  
 115 and 117 MAIN ST., SAN FRANCISCO, CAL.

## MICHIGAN COLLEGE OF MINES

A State technical school. Practical work  
 Special facilities for men of age and experience  
 Elective system. 45 weeks a year. Non-resident  
 tuition \$150 a year. For Catalogues, address

Dr. W. B. Wadsworth, Pres. Houghton, Mich.



## Zenith Gas & Gasoline Engine

The Most Perfect Made,  
 SIMPLE, NOISELESS, ECONOMIC,  
 SMOOTH RUNNING,  
 AND EASY STARTING

WM. A. FRUHLING, Agt.

218 and 218 B, Los Angeles St., Los Angeles, Cal.

Turbine  
AND  
Cascade

## WATER WHEEL

Adapted to all Heads from

3 Feet to 2000 Feet



Our experience of 33 YEARS  
 Building Water Wheels in  
 Attest to our success in the Construc-  
 tion of Water Power Plants.  
 We guarantee satisfaction.

Send for a Pamphlet of  
 either Wheel and write  
 full particulars.

James Leffel & Co.,  
 SPRINGFIELD, OHIO, U.S.A.



\$35,000,00 in Dividends paid out by Utah Mines up to date

## UTAH MINING STOCKS

Weekly Market Report on application.  
 Reference. Any bank in Salt Lake City.

P. J. CONWAY & CO.,

SALT LAKE CITY, UTAH

## SPARKS! SPARKS!!



No more  
 iron left to  
 ignite your  
 gas engine.  
 Always  
 sure of a  
 good spark  
 with our  
 dynimo  
 type ignition  
 apparatuses

AXELSON MACHINE COMPANY,  
 100 N. North Main St., LOS ANGELES, CAL.

## S. H. ELLIS,

Mines and Mining  
 Stocks, Safe  
 Investments

213 Stimson Blk., Los Angeles, Cal.

**A. S. CAGWIN,**  
 Assayer : and : Mineralogist

Gold and Silver \$2.00, Gold \$1.50  
 Copper \$2.00, Lead \$1.50  
 Mill Tests \$1.00

FRESNO, CALIFORNIA

## THOMAS J. DEE & CO.

Gold and Silver Refiners and Assayers  
 67 and 69 Washington St.,

Balton Bought and Sold CHICAGO, ILL.

## KERN COUNTY ASSAY OFFICE

H. VINCENT WALLACE,  
 Graduate Royal School of Mines

BAKERSFIELD, CALIFORNIA

## JONES ASSAY OFFICE

ESTABLISHED 1888

DENVER, COLORADO

HAS A WORLD-WIDE REPUTATION FOR

ACCURACY AND RELIABILITY

Send for price list. Mention this paper



Assayer  
 AND  
 Chemist  
 Abbot A. Banks  
 Successor to  
 Henry G. Banks,  
 The supervisor of Ores shipped to San Fran-  
 cisco a specialty. Established 1866.

718 Montgomery Street  
 San Francisco, CAL.

Sterne Bros.,

MACHINISTS AND  
 FOUNDERS

Mining Machinery, Huggins, Boilers and  
 Piping.....

Repairing Promptly Done  
 SAN DIEGO, CAL.

## THOMAS PRICE & SON

Analytical Metallurgical and Physical Testing Laboratory

524 SACRAMENTO STREET, SAN FRANCISCO, CAL.



The miner who for years has thawed powder with dry heat and "Never yet been hurt" should cease to tempt providence further, and at once provide a safety device for this work.

### THE Rundle Powder Thawer

Is an absolutely safe device  
for thawing

#### Giant Powder and other high explosives

The tubes, 20 in number, are entirely surrounded by water, thus keeping the powder in constant working order.

Send for Circulars and Prices—

**HENDRIE & BOLTHOFF Mfg Co.,**

DENVER, COLORADO, U. S. A.

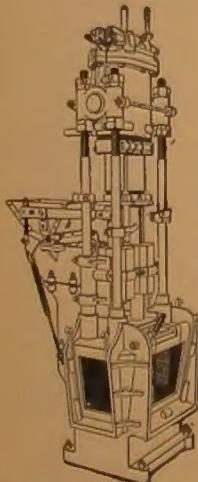
## MINING IPPE



**STEEL OR IRON.**—We make pipe of either, but recommend STEEL, it being superior to iron in many particulars and inferior to none.

WRITE FOR CIRCULARS OF  
THE TRUAZ PATENT AUTOMATIC ORE CARS.  
**SCHAW, INGRAM, BATCHER & CO., Hardware Merchants**  
SACRAMENTO, CALIFORNIA.

### The Machinery and Electrical Company,



### Machinery and Supplies

MINING HOISTS, WHIMS, ORE BUCKETS,  
Bates Corliss Engines, Snow Steam Pumps  
OIL CITY BOILERS AND ENGINES,  
Hercules Gas Engines, Lawrence Centrifugal Pumps  
GATES IRON WORKS MINING MACHINERY  
Tremaine Steam Stamp Mills  
Electric Lighting, Railway and Transmission Apparatus  
Washburn & Moen Mfg. Co's Wires and Cables

Also Dealers and Jobbers in

Shafting, Belting, Dodge Wood Pulleys, Hangers,  
Boxes, Etc.

WRITE FOR PRICES

351 & 353 N. Main St. Los Angeles, Cal.

### HALLIDIE PATENT ROPEWAY

—FOR THIS—

Transportation of Ore, Fuel and other material, has been erected by us all over the country and is the most economical and efficient method known. Nothing to get out of order; has always given satisfaction.

### California Wire Works

(LICENCES)

Offce, 330 Market St., San Francisco, Cal.



Mention the Journal

### EASTERN PRICES BEATEN

IMPROVED FACILITIES, FINEST WORK  
LOWEST PRICES

#### PERFORATED SHEET METALS

For Flour and Rice Mills, Grain Separators, Shaker Screens, Gravel and Cement, Revolving and Shot Screens, Zinc Batteries, Iron, Steel, Russia Iron, American Plated, Zinc, Copper and Brass Screens for all uses. Inventor and Manufacturer of the celebrated Slot Burred and Diagonal Slot punched Screens.

#### MINING SCREENS A SPECIALTY

Mill owners using screens extensively, can contract for large supplies at favorable rates. J. W. QUICK is the only competent and successful manufacturer of Screens on the Coast, having furnished Screens to the Principal Mills of

California, Nevada, Alaska, Mexico, Arizona, Central America, Australia and British Possessions.

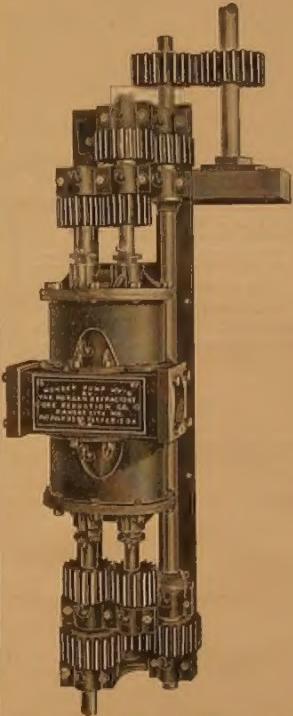
**San Francisco Pioneer Screen Works**

(Established 1866)

221 and 223 FIRST STREET, SAN FRANCISCO.

J. W. QUICK, Prop.

### THE NEW, IMPROVED WONDER PUMP,



Especially Adapted to  
MINING PURPOSES

For full particulars and Catalogues Apply to

**The Wonder Pump  
Manufacturing Company**

Armour Building, Kansas City, Mo.



**AINSWORTH NO. 043**

Sensitivity ..... 1-100 Milligramme  
Ten inch beam on which you can weigh from 1-100 to 1 Milligramme with a one milligramme rider.

Complete catalogue of Assayers' and Chemists' supplies, including this and other balances, mailed upon application. SELLING AGENTS,

**The Denver Fire Clay Co.,**  
1742-1746 Champa St.,  
Denver, Colo.  
P. O. BOX, 1540



MANUFACTURER AND DEALER IN  
**Perforated Sheet Metals,**

Steel, Russian Iron, American Plated  
Zinc, Brass and Copper.

Mining Screens of Every Description

SAN FRANCISCO, CAL.

### WIRE TRAMWAYS

Ropeways,  
Incline Planes,  
and Railways.

Hoisting Apparatus, Patent Grip Pulleys, Transmission of Power by Wire Ropes; 25 years experience; Send for Ropeway Pamphlet.

### California Wire Works

WORKS:

332 Bay Street, San Francisco, Cal.

**HANFORD IRON WORKS,**  
SAN BERNARDINO, CAL.

**Mining & Milling Machinery**

Railroad, Agricultural, Architectural  
and all kinds of iron Castings  
made on Short Notice.

Small Rock Crushers, One, Two and Three  
STAMP MILLS a Specialty.

SHOES AND DIES made on Short  
Notice.

**Caldwell Bros.**

**Tacoma and  
Seattle,  
Washington**

Cast Iron and Spiral Riveted Pipe,

Belting,  
Packing,  
Babbitt Metals,  
Asbestos Pipe & Boiler Covering  
Boiler Compound,  
Tools,  
Oils, Oil Cups and Lubricators,  
Hose,  
Steam Gauges,  
Valves,  
Injectors,  
Pumps, Steam and Centrifugal,  
Pulleys,  
Pipe and Fittings.

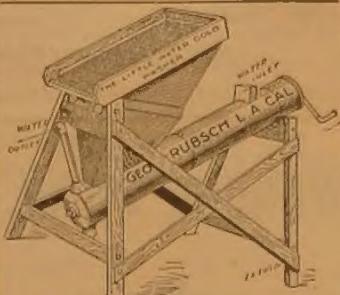
Send for Prices.

**Map of Alaska, Free!**

On request, we will send you FREE a complete MAP OF ALASKA, 16x22 inches and printed on heavy paper. It shows the route from Seattle to the Klondike Region and all other points in Alaska; indicates the gold fields, the mountains, the rivers and the streams, etc., etc. It gives a complete list of the outfit one needs for a year's stay in Alaska and the price of the same, besides a fund of information not obtainable from any other source. Write for it to-day.

Remember It Costs You Nothing, and we Pay  
the Postage.

**Montgomery Ward & Company,**  
111 to 120 Michigan Avenue,  
The Great Mail Order House. CHICAGO



The Little Water Gold Washer

The only machine made for working frozen  
ground in Alaska. Specially adapted  
on all placer work.

219 Commercial St., LOS ANGELES, CAL.

**DENVER PUBLIC ---  
SAMPLING WORKS,**

M. E. SMITH, PRESIDENT.

ORES SOLD ON THE  
PUBLIC MARKET. Denver, Colo.

**Miners Attention!**

We Sell Powder, Caps, and Fuse, **Mining Machinery**, Belting, Asbestos Goods, packing of all kinds, Picks and Shovels, Iron and Steel; Iron Wheelbarrows, Ore Sucks, Tents, Portable Forges and General Mining Supplies. Agency Trux Mfg. Co and Studebaker Wagons.

**WILCOX & ROSE CO.,**

San Bernardino, Cal.



G. C. FOWLER.

650-58 HOWARD STREET, SAN FRANCISCO

HOME MANUFACTURE

FOWLER'S

Fossil and Asbestos Sectional Covering  
As a Non-Conductor, Unequalled  
Special Rates for Steam Boilers  
and Drums.

**H. P. G. COATES,**  
**MINING AND DIVIDEND PAYING STOCKS,**

Reliable Information on Application

SALT LAKE CITY, UTAH

**Puget Sound Reduction Company**  
PURCHASERS OF  
**GOLD, SILVER, LEAD AND COPPER ORES**

Special Facilities for Handling ores from the South-West and Mexico

EVERETT

WASHINGTON

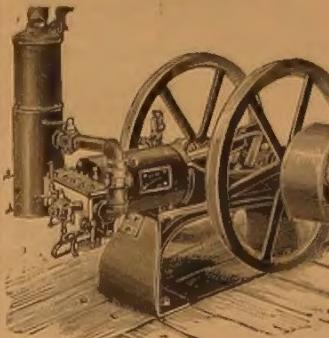
**FULTON ENGINE WORKS**  
Mining, Milling & Smelting Machinery

Estimates Furnished on all Classes of Mining Work

P. O. Box 296, STATION "C"

LOS ANGELES, CALIFORNIA

**Cheap  
Power!**



Save Money by Using

— THE —

**"DANIEL BEST"**  
Crude Oil Engine

This Engine can be operated on either Crude Oil, Distillate, Gasoline, or Kerosene. IT IS THE CHEAPEST POWER ON EARTH and is not tied to any one kind of Oil, but can use any kind that will make gas and is not handicapped by being compelled to use certain kinds. Do not forget Calif when in need of an Engine.

We guarantee our Engines to work perfectly on California Crude Oil, or Distillate, or any other kind of gaseous Oil; we however prefer CALIFORNIA CRUDE OIL, from Coalinga, Fresno county, for the reason that gas from Crude Oil will produce more power from the number of feet of gas used than from any other Oil and it is also a natural lubricant as well, the valves being always lubricated sufficiently to prevent them from sticking, thus assuring greater durability of the working parts than otherwise would be in using dry gas. And another advantage we claim is, that danger from explosions is reduced to a minimum, there being no accumulation of gas but is used by the Engine as fast as it is generated and hence is absolutely safe. The following is a test that we made with one of our Five-Horsepower Crude Oil Engines running ten hours on the different gas oils:

|                            |                    |                             |
|----------------------------|--------------------|-----------------------------|
| Cal. Crude Oil...40 grav., | 7½ gallons, at 5c. | \$ .875                     |
| Distillate...40 "          | 7½ "               | .60                         |
| Dom. Cont. Oil...40 "      | 7½ "               | 13¾c.                       |
| Gasoline...74 "            | 82 "               | 10c.                        |
|                            |                    | 1,311½                      |
|                            |                    | City Gas...1,000 feet, 2.00 |

We manufacture all sizes from two-horse power up, and will guarantee that our Engines will run cheaply and efficiently. In construction, have fewer parts and hence are more durable than any other Gas Engines on the market. Seeing is believing, don't take our word for it, but come and investigate for yourselves. You can always see one in operation at our works. We will be pleased to see you and will at all times take pleasure in showing them up. Our Engines are specially adapted for running well and mining machinery—in fact, for any kind of power desired, we are the pioneers and first inventors of Crude Oil and Distillate Engines. WE ALWAYS LEAD AND NEVER FOLLOW. Send for Catalogue and Price List of the only genuine Crude Oil and Distillate Engine made.

**The Best Manufacturing Co.**

San Leandro, Cal.

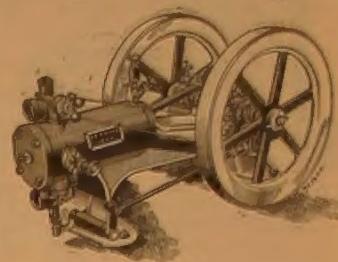
**Pueblo Foundry,  
Machine Shops and  
Boiler Works**

— MANUFACTURERS OF —

Wrought and Cast Iron Water Jacket Furnaces,  
Boiler Hoisters, Tanks, Derricks, MINING  
MACHINERY, Brass Castings; light and heavy  
Forging. New and Second-hand Engines.  
Boilers and pumps always on hand.

PUEBLO, COLORADO.

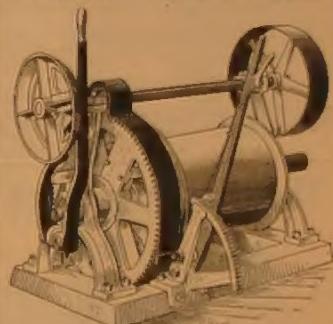
**PERKINS Gas Engine**



MODEL OF 1907

Composed of Sixteen parts, constructed so plain and substantial that it may be taken to the desert mines without fear of unreliable operations, uses Storage and Dynamo for sparking, the cooling jacket water is used over. Uses about 10 of a gallon of gasoline for each horse power for a twelve-hour run. Ten horse power engine weighs 2250 lbs. boxed for shipment.

**Perkins Power Hoist**



Is light and portable weighing 1050 lbs., heaviest piece weighs 150 lbs., capacity 1000 lbs., one hundred foot per minute, will lift 400 feet. A Safety latch follows every foot of the lift, guaranteeing absolute safety.

PRICE \$125.00

For full particulars, apply to

**Perkins Pump and Engine Co.**

204 N. Los Angeles St., Los Angeles

**L. J. Lassell,**

**ASSAYER & CHEMIST**

All Orders by mail promptly attended to  
and accuracy guaranteed. Prices  
on application.

KINGMAN. - - - ARIZONA

**JNO. LYNCH**

**Assay Office and Chemical Laboratory.**

Work by Mail Solicited. Mines Examined  
and reported on. Sampling of Ores  
attended to.

Kingman. - - - Arizona

\* MINE \*

**RAILS AND PIPE**

We have for sale large lot of 16lb  
rail for relaying and four miles  
of 10½ inch casings. Also new  
rails, all weights, for shipment  
direct from mill.

Lee Chamberlain & Co.,  
256 S. Spring St., Los Angeles

# THE PUEBLO Smelting and Refining Company,

PUEBLO, COLORADO.

---

BUYERS OF

Gold, Silver, Lead and Copper Ores,  
Copper Matte and Bullion.

---

## Refiners of Gold, Silver, Lead and Copper.

---

Manufacturers of Bar and Pig Lead, Lead Pipe, Antimonial Lead, Copper Ingots,  
Granulated Test Leads and Litharge.

Pays Highest Prices for all classes of Ores.

Especial Attention to Sampling by most Approved Processes.

Quick Returns on all Consignments.



**CHAS. B. BOOTHE & CO.**

MINING AND MILLING MACHINERY AND SUPPLIES,

Hoists, Horse Whims, Buckets, Wire Rope, Ore Cars

129 SOUTH LOS ANGELES STREET,

LOS ANGELES, CAL.

**FRANK H. HOWE.**

MECHANICAL ENGINEER

Boilers, Engines, Pumps,

Complete Steam and  
Oil Burning Plants

Mill and Mining Machinery

135 West Second Street, Los Angeles, Cal.

TELEPHONE MAIN 1357

# RISDON IRON WORKS,

MANUFACTURERS OF

## Gold Dredging Machinery

For YUKON AND KLONDIKE

Our MINING RIVER DREDGE is just the thing for placer mining in Alaska  
Shipped knocked down and, if desired, erected in running order, with self-propelling machinery.

WE ALSO MANUFACTURE ALL KINDS OF

MINING AND MILLING MACHINERY. Engines and Boilers, Stern Wheel Boats,  
Evans Patent Hydraulic Elevators and Hydraulic Giants, Water Wheels  
and Sheet Iron Riveted Pipe.



Office and Works: **Howard and Beale Sts., San Francisco, Cal.**

The Mining & Metallurgical Journal



Has its Offices:

STIMSON BLOCK, LOS ANGELES, CAL., and  
64-65 MERCHANTS' EXCHANGE, SAN FRANCISCO, CAL.

Write for Advertising Rates

# Fraser & Chalmers

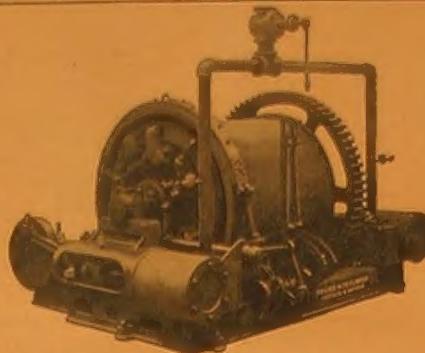
CHICAGO, ILL.

*Have Brought Out a New Line of  
MEDIUM SIZED*

## STEAM HOISTING ENGINES



These are designed with great care by engineers familiar with the best previous practice, and knowing just what is wanted to render satisfactory service on a mine. Do you want such service? Then buy one of these improved machines.



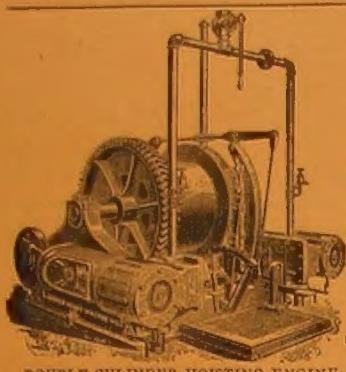
## OUR SPECIAL LINES OF MANUFACTURE

On which we would be glad to quote are:

STAMP MILLS, SMELTING FURNACES,  
CYANIDE PLANTS, ORE CRUSHERS,  
TRUE VANNER CONCENTRATORS,  
RIEDLER AIR COMPRESSORS AND PUMPS,  
OTTO AERIAL TRAMWAYS,  
SHOES, DIES, CAMS,  
ROLLS AND JIGS.

Qualified by a Quarter Century of Experience to render you the best of service we invite your inquiries and Patronage.

Fraser & Chalmers,  
CHICAGO, ILL.  
50 BROADWAY, N.Y.



## JOSHUA HENDY MACHINE WORKS,

Nos. 38 to 44 Fremont St.  
SAN FRANCISCO, CAL.

*Manufacturers of and Dealers in*

### All the Latest Improved

Quartz Milling, Pumping, Smelting and Electrical  
Machinery, Boilers & Engines OF ALL POWERS,  
Mine and Mill Supplies.

BUILDERS of "HENDY" IMPROVED "TRIPLE-DISCHARGE" TWO-STAMP MILLS

PLANS, SPECIFICATIONS and ESTIMATES OF COST FURNISHED and CONTRACTS MADE  
FOR FURNISHING and ERECTING MINING and MILLING PLANTS for all conditions of Use.

## BAKER IRON WORKS

LOS ANGELES, CALIFORNIA

*Manufacturers of*

Mining and Milling Machinery, Atlas Engines and Boilers, Worthington Steam Pumps

Water Works Machinery  
A SPECIALTY



SIOUXSIE CORLISS ENGINES

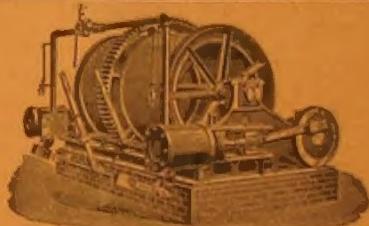
The BEST MADE Simple and Compound

## The Murray Iron Works Company,

BURLINGTON, IOWA, U. S. A.

Engines \* Boilers \* Ice Machines

OF THE BEST GRADES



HOISTING ENGINES

HIGH GRADE  
SINGLE, DOUBLE, TAIL-ROPE

## Mining Timbers and Construction Lumber

(Caledonia Long Leaf Yellow Pine Lumber)

Prices given for delivery to any point in Mexico by Rail through Porfirio Diaz, Nuevo Laredo or Paso del Norte, and by Vessel through Gulf Ports of Tampico and Vera Cruz.

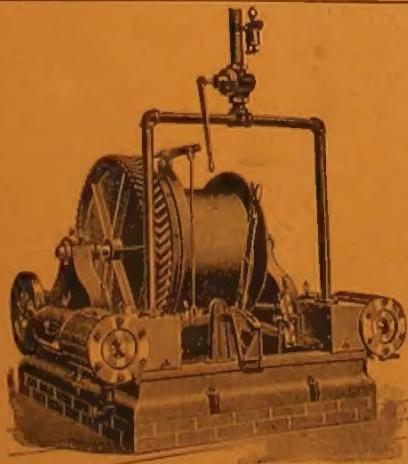
Bradley-Ramsay Lumber Co.

LOUISIANA, U. S. A.

ADDRESS INQUIRIES FOR PRICES TO

R. N. WATSON, AGENT.

APARTADO NO. 118 MONTGOMERY, N. L. MEXICO



## PARKE & LACY COMPANY

21 and 23 Fremont St., San Francisco, Cal.



## MINING MACHINERY

SOLE AGENTS FOR THE INGERSOLL-SERGEANT AIR COMPRESSORS AND ROCK DRILLS.

SOLE LICENSEE FOR THE MANUFACTURE AND SALE OF THE ROPP STRAIGHT LINE FURNACE, For Roasting, Chlorinating and Desulphurizing Ores.

WE CARRY IN STOCK

Horizontal, Vertical and Portable Engines and Boilers. Rock Breakers, Cornish Rolls, Pulverizers, Concentrators, Ore Feeders. Hoisting Engines, Horse Power Hoisting Whims, Water Wheels, Steam Pumps, Ore Cars, Wire Rope, Ore Buckets, Water Buckets, Skips, Blowers and Exhaust Fans, Shafting and Pulleys, Belting, Oils and Mine Supplies. MAGANESE STEEL SHOES and Dies

Estimates furnished for Complete Plants for Hoisting Works, Smelters, Concentrating and Stamp Mills.